

DATA PROCUREMENT DOC.

NO. ISSUE

**916 DRAFT**

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CONTRACT/RFP

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EXHIBIT NUMBER

**J-2**

\_\_\_\_\_  
ATTACHMENT NUMBER

Microgravity Science and Applications Department  
Systems Development and Operations Services

\_\_\_\_\_  
PROJECT/SYSTEM

## ***DATA PROCUREMENT DOCUMENT***

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CONTRACTOR

**February 15, 2001**

\_\_\_\_\_  
DATE

National Aeronautics and  
Space Administration  
\_\_\_\_\_



National Aeronautics and Space Administration			DATA PROCUREMENT DOC.		
<b>PAGE REVISION LOG</b>			NO.      ISSUE		
			<b>916      Draft</b>		
NOTE: The current revision is denoted by a vertical line in the outer margin adjacent to the affected text.		AS OF:		SUPERSEDING:	
				PAGE:	
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ITEM	PAGE	STATUS	ITEM	PAGE	STATUS

## 1.0 INTRODUCTION

1.1 Scope: Subject to the Rights in Data clause, this Data Procurement Document (DPD) sets forth the data requirements in each Data Requirements Description (DRD) and shall govern that data required by the DPD for the contract. The contractor shall furnish data defined by the DRD's listed on the Data Requirements List (DRL) by category of data, attached hereto, and made a part of this DPD. Such data shall be prepared, maintained, and delivered to MSFC in accordance with the requirements set forth within this DPD. In cases where data requirements are covered by a Federal Acquisition Regulation (FAR) or NASA FAR Supplement (NFS) regulation or clause, the regulation will take precedence over the DPD, per FAR 52.215-8.

1.2 DPD Description: This DPD consists of a Document Change Log, a Page Revision Log, a Table of Contents, an Introduction, a Statement of General Requirements, DPD maintenance procedures, a DRL, and the DRD's.

1.2.1 General Requirements: The general requirements, as specified in paragraph 2.0 of this DPD, prescribe those requirements applicable to the preparation, maintenance, and delivery of data that are better defined in aggregate than in the individual DRD's.

1.2.2 Data Requirements List (DRL): Throughout the performance of the contract, the DRL provides a listing by data category of the data requirements of the DPD.

### 1.2.3 Data Requirements Descriptions (DRD's)

1.2.3.1 Each data requirement listed on the DRL is given complete definition by a DRD. The DRD prescribes content, format, maintenance instructions, and submittal requirements.

1.2.3.2 For the purpose of classification and control, DRD's of this DPD are grouped into the following broad functional data categories:

<u>CATEGORY SYMBOL</u>	<u>DESCRIPTION</u>
CD	Contractual Data
CM	Configuration Management
LS	Logistics/Support
MA	Management
QE	Quality Engineering
RM	Reliability and Maintainability
SA	Safety
SE	Systems Engineering

1.2.3.3 The symbols representing these data categories form part of the prefix of the DRD identification number. The first numerical characters reflect the DPD number.

1.2.3.4 To facilitate the usage and maintenance of the DPD, the DRD's have been sectionalized in accordance with the above data categories.

- 1.2.3.5 The DRD's are filed by data category and are in alpha-numeric sequence as listed on the DRL page (or pages) that precedes the DRD's.
- 1.2.4 Document Change Log (DCL) and Page Revision Log (PRL): The Document Change Log chronologically records all revision actions that pertain to the DPD. The Page Revision Log describes the current revision status of each page of the DPD and thus, at all times, provides its exact configuration.
- 1.2.5 DPD Maintenance Procedures: Maintenance procedures define the detailed methods to be employed in maintaining the DPD. Detailed maintenance procedures are specified in paragraph 3.0 of this DPD.
- 1.3 Data Types for Contractual Efforts: The types of data and their contractually applicable requirements for approval and delivery are:

<u>TYPE</u>	<u>DESCRIPTION</u>
1	All issues and interim changes to those issues require written approval from the requiring organization before formal release for use or implementation.
2	MSFC reserves a time-limited right to disapprove in writing any issues and interim changes to those issues. Data shall be submitted to the procuring activity for review not less than 45 calendar days prior to its release for use or implementation. The contractor shall clearly identify the release target date in the "submitted for review" transmittal. If the contractor has not been notified of any disapproval prior to the release target date, the data shall be considered approved. To be an acceptable delivery, disapproved data shall be revised to remove causes for the disapproval before its release.
3	These data shall be delivered by the contractor as required by the contract and do not require MSFC approval. However, to be a satisfactory delivery, the data must satisfy all applicable contractual requirements.
4	These data are produced or used during performance of the contract and are retained by the contractor. They shall be delivered when MSFC requests it according to instructions in the request. The contractor shall maintain a list of these data and shall furnish copies of the list to MSFC when requested to do so.
5	These data are incidental to contract performance and are retained by the contractor in those cases where contracting parties have agreed that delivery is not required. However, the Contracting Officer or the Contracting Officer's Representative shall have access to and can inspect this data at its location in the contractor's or subcontractor's facilities.

## 2.0 STATEMENT OF GENERAL REQUIREMENTS

2.1 Applicable Documents: Documents included as applicable documents in this DPD are the issue specified in the Statement of Work, and form a part of the DPD to the extent specified herein. References to documents other than applicable documents in the data requirements of this DPD may sometimes be utilized. These do not constitute a contractual obligation on the contractor. They are to be used only as a possible example or to provide related information to assist the contractor in developing a response to that particular data requirement.

## 2.2 Subcontractor Data Requirements

2.2.1 The contractor shall specify to subcontractors and vendors, if any, the availability source of all data required for the satisfactory accomplishment of their contracts. The contractor shall validate these requirements for documents when appropriate; where the requirement concerns other contractor data, the contractor shall provide his subcontractor or vendor with the necessary documents. All such requests shall be accomplished under the auspices of the contractor.

2.2.2 Reference to subcontractor data in the contractor's responses is permissible, providing the references are adequate and include such identification elements as title, number, revision, etc., and a copy of the referenced data is supplied with the response document at time of delivery to MSFC.

## 2.3 Distribution

2.3.1 Distribution of required documentation shall be in quantities determined by the Contracting Officer. Recipient names and addresses shall be noted on a separate distribution list to be furnished by the Contracting Officer. Distribution will be addressed for basic contract and re-addressed for each delivery order.

2.3.2 Electronic submission of data deliverables is preferred. The preferred formats include Microsoft Word, Excel, PowerPoint, or Adobe Acrobat PDF as appropriate. The software versions shall be confirmed prior to submittals. Marshall Policy Directive (MPD) 2210.1 specifies the requirements for utilizing the Documentation Repository. Electronic data submittals to the Repository shall be coordinated with the Repository. MSFC has the capability of receiving electronic data files for importing into the MSFC Documentation Repository system. Computer-Aided Design (CAD) drawings shall be submitted in the original native vector, Hewlett-Packard Graphic Language (HPGL) and raster image formats.

- 2.4 Printing: All printing, duplicating, or binding shall be in accordance with NFS 1852.208-81, Restrictions on Printing and Duplicating. Printing of formal reports and Type 1 and 2 data in book format shall be in accordance with the following general specifications:
- Method of reproduction – offset/xerography.
  - Finished size – 8 1/2" X 11".
  - Paper – 20-pound opaque bond.
  - Cover – Litho cover stock.
  - Pages will be printed on both sides; blank pages will be avoided when possible.
  - Oversize pages will be avoided when possible, but if necessary will be folded to 8 1/2" X 11".
  - Binding shall be the most economical method commensurate with the size of the report and its intended use.
- 2.5 Microfilm: When microfilm of drawings, specifications, and associated lists is required, it shall be 35mm silver halide negative, first generation (Type 1, Class 1) in accordance with ANSI/AIIM MS32-1987 (Microrecording of Engineering Source Documents on 35mm Microfilm). Input Form DD Form 1562, Dual Purpose Engineering Document Card, shall be used for microfilm purposes. The microfilm shall be submitted in the form of roll microfilm or master microfilm aperture cards. If microfilm rolls are used, they shall not exceed 100 feet in length. Deviations from these requirement shall be approved by the Contracting Officer. All deviations shall be coordinated with the MSFC Micrographics Manager, located in the Documentation Repository.
- 2.6 Contractor's Internal Documents: The contractor's internal documents shall be used to meet the data requirements of this DPD unless a specific format is required by the applicable DRD.
- 2.7 Document Identification: Type 1 and 2 documents published by the contractor and submitted in response to the data requirements of this DPD shall be identified within an organized identification numbering system prescribed to MSFC by the contractor and, if applicable, as approved by MSFC. This number, change legend, date, and title constitute the minimum identification of the specific document and shall appear on the cover and title page. The contract number shall also appear on the cover and title page as separate markings. The originator and organization shall be included on the title page. The document number, change legend, and date shall appear on each page of the document. In the front matter of each document, identify the DPD number and applicable DRD number(s) required for document preparation. Successive issues or revisions of documents shall be identified in the same manner as the basic issue and shall have appropriate change identification. Drawings and ECP's are excluded from the marking provisions of this paragraph. All Type 1 documentation, excluding configuration management requirements, will be marked "PRELIMINARY PENDING MSFC APPROVAL," and once approved shall be reissued with "APPROVED BY MSFC" and the date and approval authority annotated on the cover.
- 2.8 Reference to Other Documents in Data Submittals: All referenced documents shall be made readily available to the cognizant MSFC organization upon request. The contractor should make sure that the references are available to MSFC in a manner which does not incur delays in the use of the response document.

## 2.9 Maintenance of Type 1 Document Submittals

- 2.9.1 Revisions of Type 1 documentation may be accomplished either by individual page revision or by a complete reissue of the document identified in accordance with requirements of 2.7 above, with the exception of drawings (which shall be revised in accordance with contract configuration management requirements).
- 2.9.2 Individual page revisions shall be made as deemed necessary by the contractor or as directed by the Contracting Officer.
- 2.9.3 A Type 1 document shall be completely reissued when, in the opinion of the contractor and/or MSFC, the document has been revised to the extent that it is unusable in its present state, or when directed by the Contracting Officer. When complete reissues are made, the entire contents of the document shall be brought up to date and shall incorporate revised pages. All revisions shall be recorded. A revision log shall identify complete reissues except for periodic reports and documents which are complete within themselves as final.
- 2.9.4 Changes of a minor nature to correct obvious typing errors, misspelled words, etc., shall only be made when a technical change is made, unless the accuracy of the document is affected.
- 2.9.5 All revised pages shall be identified by a revision symbol and a new date. Each document shall contain a log of revised pages that will identify the revision status of each page with the revision symbol. This list shall follow the table of contents in each document. The line or lines revised on a given page shall be designated by the use of vertical line in the margin of the page, and the change authority shall be indicated adjacent to the change.
- 2.9.6 Contractor Type 1 documents shall not be submitted containing pen and ink markups which correct, add to, or change the text, unless schedule problems exist and approval is obtained in writing from the Contracting Officer. Such markups, however, shall not exceed 20 percent of the page content and shall be acceptable provided that the reproduced copies are legible. In addition, hand-drawn schematics, block diagrams, data curves, and similar charts may be used in original reports in lieu of formally prepared art work, as long as legibility of copies is not impaired. Acceptability will be determined by the Contracting Officer.

## 3.0 DPD MAINTENANCE PROCEDURES

- 3.1 MSFC-Initiated Change: New and/or revised data requirements will be incorporated by contract modification to which the new or revised portion of the DPD will be appended. The contractor shall notify the Contracting Officer in the event a deliverable data requirement is imposed and is not covered by a DRD, or when a DRD is changed by a contract modification and for which no revision to DPD is appended. In such cases, the contractor shall submit the requested changes to MSFC for approval. See paragraph 3.3.1 for change procedures.
- 3.2 Contractor-Initiated Change: Contractor-proposed data requirements, or proposed changes to existing requirements shall be submitted to MSFC for approval.

### 3.3 DPD Change Procedures

- 3.3.1 Changes to a contractual issue of this DPD will be identified by MSFC on the Document Change Log and Page Revision Log. The actual revised material on the DPD page will be identified by placing a heavy vertical line in the right-hand margin extending the entire length of the change. In addition, the numerical control number of the contractual direction authorizing the change shall be placed adjacent to the vertical revision line. These revision identifiers shall be used to reflect the current revision only; any previous symbols on a page will be deleted by the current revision.
- 3.3.2 The date of the contractual direction paper, e.g., Change Order, Supplemental Agreement, or Contracting Officer's letter shall be entered under the "Status " column of the Page Revision Log adjacent to the affected page or DRD number, and in the "as of" block. The of" block will be entered in the "Superseding" block.
- 3.3.3 The Document Change Log entitled "Incorporated Revisions" will be changed to indicate the number, portions affected, and associated Supplemental Agreement number, if applicable.
- 3.3.4 The Document Change Log entitled "Outstanding Revisions" is changed periodically to indicate outstanding Change Orders and Contracting Officer notification letters.

### 3.4 DPD Reissues

- 3.4.1 When conditions warrant, the DPD will be reissued by MSFC and will supersede the existing DPD in its entirety. Reissues will be issued by contractual direction.
- 3.4.2 All revision symbols (vertical lines and contractual direction control numbers) will be removed from all pages; revision dates shall remain in the Date Revised block on DRD's that have been revised. The issue symbol, which will commence with "A" and progress through "Z," will be entered in the DPD identification block of each DRD page of the DPD.

**Microgravity Science and Applications Department Systems Development and  
Operation Systems  
Data Requirements List**

<u>DRD</u>	<u>DATA TYPE</u>	<u>TITLE</u>	<u>OPR</u>
CD – Contractual Data			
916CD-001	3	Technology Reports (NFS 1852.227-70)	CD30
916CD-002	3	On-Site Employee Location Listing	PS10
CM - Configuration Management			
916CM-001	2	Configuration Management Plan	ED43
916CM-002	1	Specifications	ED43
916CM-003	3	Engineering Drawings and Associated Lists	ED43
916CM-004	3	Specification and Drawing Tree	ED43
916CM-005	1	Engineering Change Proposals and Associated Documentation	ED43
916CM-006	1	Deviations/Waiver Approval Requests	ED43
916CM-007	3	Configuration Accounting and Status Reports	ED43
916CM-008	2/3	Functional Configuration/Physical Configuration Audit Documentation	ED43
916CM-009	1	Acceptance Data Package	ED43
LS – Logistics Support			
916LS-001	2	Government Property Management Plan	AD41
MA – Management			
916MA-001	1	Management Plan	RS40
916MA-002	2	Risk Management Plan, Analysis, and Tracking Reports	QS10
916MA-003	1	Earned Value Management System Description (Criteria)	RS40
916MA-004	3	Financial Management Report (533M and 533Q)	RS40
916MA-005	3	Monthly Performance Report	BJ01
916MA-006	3	Technical Performance Report	RS40
916MA-007	3	Cost Performance Report	
916MA-008	3	Work Breakdown Structure (WBS) & WBS Dictionary	RS40/ VS10
- Quality Engineering			
916QE-001	1	Quality Plan QS22	
916QE-002	3	Nonconformance Record and Summary Reports	QS22
RM - Reliability and Maintainability			
916RM-001	1	Reliability and Maintainability Program Plan	QS22
916RM-002	2/1	Failure Modes and Effects Analysis and Critical Items List	QS22
916RM-003	2	Problem Reporting and Corrective Action	QS22
916RM-004	3	MSFC ALERT System Documentation	QS22
916RM-005	2	Limited Life Items List	QS22
916RM-006		Reliability and Maintainability Predictions Report ??	

**Microgravity Science and Applications Department Systems Development and  
Operation Systems  
Data Requirements List**

<u>DRD</u>	<u>DATA TYPE</u>	<u>TITLE</u>	<u>OPR</u>
SA – Safety			
916SA-001	1	Off-site Contractor Safety Program Plan	QS22/ AD10
916SA-002	3	Mishap and Safety Statistics Reports	QS22
916SA-003	1	System Safety/Hazard Analysis Report	QS22
SE - Systems Engineering			
916SE-001	1	Interface Control Documents ED43	

NOTE: These requirements apply to all statement of work/WBS elements. Applicability of these requirements and additional data requirements will be established with each Delivery Order per those applicable requirements as defined in the Microgravity Science and Applications Department Process Document, Appendix for Data Requirements.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916CD-001**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/3
6. **TITLE:** Technology Reports (NFS 1852.227-70)
7. **DESCRIPTION/USE:** Provides NASA with technical information concerning any invention, discovery, improvement, or innovation made by a contractor in the performance of work under this contract for the purpose of disseminating this information to obtain increased use. Also, to provide NASA with data to review for possible patentable items.
8. **OPR:** CD30                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:**  
Technology Reporting Plan: Upon Contracting Officer's request.  
Disclosure of Invention and New Technology (NASA Form 1679): Within 2 months of identification of reportable item.  
Interim NASA-MSFC Technology Report (MSFC Form 4204): 12 months from the date of the contract.
12. **SUBMISSION FREQUENCY:**  
Technology Reporting Plan: Upon Contracting Officer's request.  
Disclosure of Invention and New Technology (NASA Form 1679): For each reportable item.  
Interim NASA-MSFC Technology Report (MSFC Form 4204): Every 12 months.  
Final NASA-MSFC Technology Report (MSFC Form 4204): Three months after completion of contracted work.
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Technology Reports include technical detail as is necessary to identify and fully describe a "Reportable Item". Per NFS 1852.227-70, "Reportable Item" means any invention, discovery, improvement, or innovation of the contractor, whether or not the same is or may be patentable or otherwise protectable under Title 35 of the United States Code, conceived or first actually reduced to practice in the performance of any work under this contract or in the performance of any work that is reimbursable under any clause in this contract providing for reimbursement of costs incurred prior to the effective date of this contract.
- 15.2 **APPLICABLE DOCUMENTS**  
NFS 1852.227-70                      New Technology Clause
- 15.3 **CONTENTS:** The Technology Reports consist of:
  - a. Disclosure of Invention and New Technology (Including Software): In accordance with NFS 1852.227-70 (e)(2), the disclosure to the agency shall be in the form of a written report and shall identify the contract under which the reportable item was made and the inventor(s) or innovator(s). It shall be sufficiently complete in technical detail to convey a clear understanding, to the extent known at the time of the disclosure, of the nature, purpose, operation, and physical, chemical, biological, or electrical characteristics of the reportable item.

## DRD Continuation Sheet

**TITLE:** Technology Reports (NFS 1852.227-70)

**DRD NO.:** 916CD-001

**DATA TYPE:** 3

**PAGE:** 2/3

**15. DATA PREPARATION INFORMATION (CONTINUED):**

The disclosure shall also identify any publication, on sale, or public use of any subject invention and whether a manuscript describing such invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to the agency, the Contractor will promptly notify the agency of the acceptance of any manuscript describing a subject invention for publication or of any on sale or public use planned by the Contractor for such invention. This reporting requirement may be met by completing NASA Form 1679 (February 1998). Use of this form is preferred; however, if the form is not used the following information should be provided in order to meet the reporting requirement:

1. Descriptive title.
2. Innovator(s) name(s), title(s), phone number(s), and home address(es).
3. Employer when innovation made (name and division).
4. Address (place of performance).
5. Employer status (e.g., Government, college or university, non-profit organization, small business firm, large entity).
6. Origin (e.g., NASA grant number, NASA prime contract number, subcontractor, joint effort, multiple contractor contribution, other).
7. NASA Contracting Officer's Technical Representative (COTR).
8. Contractor/grantee New Technology Representative.
9. Brief abstract providing a general description of the innovation:
  - (a) Description of the problem or objective that motivated the innovation's development.
  - (b) Technically complete and easily understandable description of innovation developed to solve or meet the objective.
  - (c) Unique or novel features of the innovation and the results or benefits of its application.
  - (d) Speculation regarding potential commercial applications and points of contact (including names of companies producing or using similar products).
10. Additional documentation.
11. Degree of technological significance (e.g., modification of existing technology, substantial advancement in the art, major breakthrough).
12. State of development (e.g., concept only, design, prototype, modification, production model, used in current work).
13. Patent status.
14. Dates or approximate time period during which this innovation was developed.
15. Previous or contemplated publication or public disclosure including dates.
16. Answers to the following questions (for software only):
  - (a) Using outsiders to beta-test code? If yes, done under beta-test agreement?
  - (b) Modifications to this software continue by civil servant and/or contractual agreement?
  - (c) Previously copyrighted (if so, by whom)?
  - (d) Were prior versions distributed (if yes, supply NASA or Contractor contract)?
  - (e) Contains or is based on code owned by a non-federal entity (if yes, has a license for use been obtained)?
  - (f) Has the latest version been distributed without restrictions as to use or disclosure for more than one year (if yes, supply date of disclosure)?
17. Name(s) and signature(s) of innovator(s).

## DRD Continuation Sheet

**TITLE:** Technology Reports (NFS 1852.227-70)

**DRD NO.:** 916CD-001

**DATA TYPE:** 3

**PAGE:** 3/3

15. **DATA PREPARATION INFORMATION (CONTINUED):**

- b. Interim NASA-MSFC Technology Report: This report shall consist of a listing of reportable items for the reporting period or certify that there are none. This report shall also contain a list of subcontracts containing a patent rights clause or certification that there were no such subcontracts. Completion of MSFC Form 4204 will satisfy this reporting requirement. Use of the form is preferred; however an alternate format is acceptable provided all required information is provided.
- c. Final NASA-MSFC Technology Report: This report shall consist of a comprehensive list of all reportable items for the contract duration or certification that there are none. This report shall also contain a list of subcontracts containing a patent rights clause or certification that there were no such subcontracts. Completion of MSFC Form 4204 will satisfy this reporting requirement. Use of the form is preferred; however an alternate format is acceptable provided all required information is provided.
- d. Subcontracts: The contractor shall provide copies of subcontracts containing a patent rights clause upon Contracting Officer's request.

15.4 **FORMAT:**

The Disclosure of Invention and New Technology (Including Software) report may use NASA Form 1679 (February 1998) or provide sufficient information to meet the reporting requirement.

The interim and final NASA-MSFC Technology Reports may use MSFC Form 4204 (February 1993) or provide sufficient information to meet the reporting requirement.

Referenced forms may be obtained from the Contracting Officer or New Technology Representative.

15.5 **MAINTENANCE:** None required.

## DATA REQUIREMENTS DESCRIPTION (DRD)

- |   |   |
|---|---|
| 1. <b>DPD NO.:</b> 916 <b>ISSUE:</b> Draft<br>3. <b>DATA TYPE:</b> 3<br><br>6. <b>TITLE:</b> On-Site Employee Location Listing<br><br>7. <b>DESCRIPTION/USE:</b> To assist NASA in conducting contractor floor checks.<br><br>8. <b>OPR:</b> PS10                      9. <b>DM:</b> SD40<br><br>10. <b>DISTRIBUTION:</b> Per Contracting Officer's letter<br><br>11. <b>INITIAL SUBMISSION:</b> Fifteenth of month following first month of operation after Authority to Proceed (ATP)<br><br>12. <b>SUBMISSION FREQUENCY:</b> Update quarterly. If deemed necessary by the Contracting Officer, the contractor shall submit the list at times other than stated.<br><br>13. <b>REMARKS:</b> Reference is made to FAR 52.215-2, <i>Federal Acquisition Regulation</i> Clause: Audit - Negotiation.<br>14. <b>INTERRELATIONSHIP:</b><br><br>15. <b>DATA PREPARATION INFORMATION:</b><br>15.1 <b>SCOPE:</b> The On-Site Employee Location Listing shall provide NASA with a list of all on-site contractor employees working under this contract and their designated locations.<br><br>15.2 <b><u>APPLICABLE DOCUMENTS:</u></b> None<br><br>15.3 <b><u>CONTENTS:</u></b> The list shall include the following information for each employee: employee's name, position, location (building/room number), shift assignment, supervisor's name, and supervisor's location (building/room number).<br><br>15.4 <b><u>FORMAT:</u></b> Contractor format is acceptable.<br><br>15.5 <b><u>MAINTENANCE:</u></b> None required | 2. <b>DRD NO.:</b> <b>916CD-002</b><br>4. <b>DATE REVISED:</b><br>5. <b>PAGE:</b> 1/1 |
|---|---|

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916CM-001**
3. **DATA TYPE:** 2
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Configuration Management Plan
7. **DESCRIPTION/USE:** To describe the contractor's method for accomplishing the configuration management requirements of the contract.
8. **OPR:** ED43                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** 60 days after Authority to Proceed (ATP)
12. **SUBMISSION FREQUENCY:** One time, revise as required
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Configuration Management Plan (CMP) provides the contractor's proposed management approach for implementation of configuration management.
- 15.2 **APPLICABLE DOCUMENTS**  
MIL-STD-973                      *Military Standard, Configuration Management*
- 15.3 **CONTENTS:** The CMP shall provide the information defined in MIL-STD-973, Appendix A.
- 15.4 **FORMAT:** Contractor format is acceptable with MSFC approval.
- 15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue. Update as required to maintain current with program changes.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916CM-002**
3. **DATA TYPE:** 1
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Specifications
7. **DESCRIPTION/USE:** To specify the performance and design requirements for the system, subsystem, components, and required support equipment.
8. **OPR:** ED43                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** NOTE: To be specified for each procurement based on project phase and requirements
12. **SUBMISSION FREQUENCY:** NOTE: To be specified for each procurement based on project phase and requirements
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** Specifications provide the performance, design detail, and verification requirements for the system and support equipment.
- 15.2 **APPLICABLE DOCUMENTS**  
MIL-STD-961                      *Department of Defense Standard Practices for, Defense Specifications*
- 15.3 **CONTENTS:** The specifications shall be prepared in accordance with MIL-STD-961, Appendix A.
- 15.4 **FORMAT:** The format shall be in accordance with the instructions in MIL-STD-961, Appendix A.
- 15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue. Changes shall be submitted by Specification Change Notice, via an Engineering Change Proposal (ECP).

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916CM-003**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/3
6. **TITLE:** Engineering Drawings and Associated Lists
7. **DESCRIPTION/USE:** To provide engineering data to define the design to the extent required to support manufacturing, test, and logistics support of the vehicle and payload systems and required spare and repair parts. Engineering drawings shall also be provided that depict detailed configuration definition of the electrical, pneumatic, fluid equipment and system interfaces for required ground support equipment.
8. **OPR:** ED43                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Three weeks prior to Preliminary Design Review (PDR)
12. **SUBMISSION FREQUENCY:** Three weeks prior to each major review
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** Engineering drawings disclose (directly or by reference), by means of graphics or textual presentation, or combinations of both, the physical and functional requirements of an item.
- 15.2 **APPLICABLE DOCUMENTS**

MIL-DTL-31000	<i>General Specification for Technical Data Package</i>
MIL-STD-100	<i>Engineering Drawing Practices</i>
MIL-STD-961	<i>Department of Defense Standard Practices, Defense Specifications</i>
- 15.3 **CONTENTS:** Requirements:
  - a. Part I - Product drawings and associated lists shall meet the requirements of MIL-DTL-31000 as tailored within this document and shall conform to the requirements of MIL-STD-100. Product drawings and associated lists shall provide the design disclosure information necessary to define the details necessary for the manufacture, test, inspection, and logistic support of the system. The drawings shall:
    1. Reflect the end-product at its current level of design maturity.
    2. Provide the engineering data for logistics support products.
    3. Provide the necessary data to permit manufacture and/or acquisition of items identical to the original item(s).
    4. Document directly or by reference the following (in accordance with MIL-STD-100):
      - (a) Details of unique processes (i.e., not published or generally available to industry) when essential to design and manufacture.
      - (b) Performance ratings.
      - (c) Dimensional and tolerance data.
      - (d) Critical manufacturing processes and assembly sequences.
      - (e) Tolerance input and output characteristics.
      - (f) Diagrams.

## DRD Continuation Sheet

**TITLE:** Engineering Drawings and Associated Lists

**DRD NO.:** 916CM-003

**DATA TYPE:** 3

**PAGE:** 2/3

**15. DATA PREPARATION INFORMATION (CONTINUED):**

- (g) Mechanical and electrical connections.
  - (h) Physical characteristics, including form and finish.
  - (i) Details of material identification, including heat treatment and protective coatings.
  - (j) Inspection, test, and evaluation criteria.
  - (k) Equipment calibration requirements.
  - (l) Quality assurance requirements.
  - (m) Hardware marking requirements.
  - (n) Requirements for reliability, maintainability, environmental conditions, shock, and vibration testing and other operational or functional tests.
5. Item definition - All parameters required to define each unit, assembly, subassembly, part, or material shall be presented on the applicable drawing. This includes data such as the following:
- (a) All necessary mechanical dimensions and electrical parameters to fully define fabrication, acceptance, interface, or installation of the item depicted (i.e., weight, pressure, viscosity).
  - (b) All other necessary physical parameters to fully define fabrication, acceptance, interface, or installation of the item depicted (i.e., weight, pressure, viscosity).
  - (c) All necessary environmental conditions which units, assemblies, subassemblies, parts, and materials must meet to perform effectively in the configuration item, such that the configuration item will meet its specification requirements.
6. Limited rights-in-data items - Product drawings for items which the Government does not have unlimited rights in data shall specify the form, fit, and function requirements of the item and conform to the requirements for a control drawing as defined in MIL-STD-100 or a specification prepared in accordance with the requirements of MIL-STD-961, Appendix A.
- b. Part II - Cable interconnect diagrams (CID's), electrical system schematics, and wiring lists. Cable interconnect diagrams, electrical system schematics, wiring lists, and fluid system schematics shall be prepared in accordance with MIL-STD-100. Part I drawings shall be utilized to the maximum extent possible in providing these drawings. The drawings shall include the following:
- 1. Cable interconnect diagrams shall show graphically the arrangement of external electrical cabling which interconnects electrical assemblies and/or equipment. The CID shall show all cable runs and terminations; each cable shall be identified by title and reference designation number. The connector short sign and cable electromagnetic effects classification by bundle shall be identified.
  - 2. Electrical system schematics shall illustrate and describe circuit items with symbols placed such that a circuit may be traced from item to item in the sequence of its function. The placement and arrangement of these circuits shall follow a logical sequence of presentation to provide a clear description of the distribution, attendant interlocking, and content of circuits.
  - 3. Component Level Documentation - Schematics and/or wiring lists for components, including interconnecting cable harnesses, shall be provided.
  - 4. Overall Grounding Schematic - The grounding schematic shall show the details of all grounds and power returns from source to loads. All connections shall be shown including black box details. It shall also show details of all Electrical Ground Support Equipment interconnections to facility and safety grounds.

## DRD Continuation Sheet

**TITLE:** Engineering Drawings and Associated Lists

**DRD NO.:** 916CM-003

**DATA TYPE:** 3

**PAGE:** 3/3

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15. **DATA PREPARATION INFORMATION (CONTINUED):**

5. The Fluid system schematic shall illustrate and describe all components with symbols and flow designators such that the fluid system may be traced from component to component (such as pumps, valves, meters, regulators, and filters). The schematics shall document the range requirements (flow, temperature, and pressure) for all component external interfaces and line sizes. The placement and arrangement of these components shall follow a logical sequence of presentation to provide a clear description of the flow of fluids in the system. The schematics shall reference engineering drawings and associated lists for configuration details.

15.4 **FORMAT:** Format of product drawings shall be in accordance with MIL-STD-100. Contractor's CAGE number and document numbers will be utilized.

15.5 **MAINTENANCE:** All documents produced under this DRD must be maintained current. Changes to and/or updating of engineering drawings and associated lists shall be in accordance with the contractor's approved drawing system and the provisions herein. Changes to engineering drawings under the Government's Class I change control shall be submitted by Engineering Change Proposal.

## DATA REQUIREMENTS DESCRIPTION (DRD)

- |  |   |
|--|---|
| 1. <b>DPD NO.:</b> 916 <b>ISSUE:</b> Draft<br>3. <b>DATA TYPE:</b> 3<br><br>6. <b>TITLE:</b> Specification and Drawing Trees<br><br>7. <b>DESCRIPTION/USE:</b> A specification tree is a generation breakdown of the specifications with interrelationships, as applicable, to the contract configuration items. A drawing tree is a generation breakdown of the engineering drawings that depicts the allocation of requirements of the contract configuration item specification.<br><br>8. <b>OPR:</b> ED43                      9. <b>DM:</b> SD40<br><br>10. <b>DISTRIBUTION:</b> Per Contracting Officer's letter<br><br>11. <b>INITIAL SUBMISSION:</b> Specification trees - Three weeks prior to Preliminary Design Review (PDR). Drawing trees - Three weeks prior to Critical Design Review (CDR).<br><br>12. <b>SUBMISSION FREQUENCY:</b> Specification tree updated for CDR; specification and drawing trees updated for the Physical Configuration Audits (PCA).<br>13. <b>REMARKS:</b><br>14. <b>INTERRELATIONSHIP:</b><br><br>15. <b>DATA PREPARATION INFORMATION:</b><br>15.1 <b>SCOPE:</b> Specification and Drawing Trees depict the hardware and software configuration items in top down, or generation breakdown form.<br><br>15.2 <b><u>APPLICABLE DOCUMENTS:</u></b> None<br><br>15.3 <b><u>CONTENTS:</u></b> The specification and drawing trees shall consist of an indentured or generation breakdown listing of all specifications or drawings applicable to a configuration item or items.<br><br>15.4 <b><u>FORMAT:</u></b> Contractor format is acceptable.<br><br>15.5 <b><u>MAINTENANCE:</u></b> Changes shall be incorporated by complete reissue or change page if hard copy is necessary. | 2. <b>DRD NO.:</b> <b>916CM-004</b><br>4. <b>DATE REVISED:</b><br>5. <b>PAGE:</b> 1/1 |
|--|---|

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916CM-005**
3. **DATA TYPE:** 1
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** Engineering Change Proposals and Associated Documentation
7. **DESCRIPTION/USE:** To propose changes to Government controlled configuration documentation, e.g., engineering changes to drawings, parts lists, specifications, software requirements documents, and interface control documents.
8. **OPR:** ED43                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** As required
12. **SUBMISSION FREQUENCY:** As required
13. **REMARKS:** Reference is made to MIL-STD-973, *Military Standard, Configuration Management*.
14. **INTERRELATIONSHIP:** NFS 1852.243-70, *Engineering Change Proposals*, (February 1998)
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** To describe proposed changes with supporting rationale to Government-controlled configuration documentation.
- 15.2 **APPLICABLE DOCUMENTS:** None
- 15.3 **CONTENTS:**
  - a. The requirements of MIL-STD-973 shall be used as a guide in the preparation of proposed changes to Government-controlled configuration documentation. The following MSFC forms shall be prepared as required to define the specific requirements for a proposed change.
    1. Engineering Change Proposals (ECP's) - MSFC Form 2348.
    2. Specification Change Notices (SCN's) - MSFC Form 3209.
    3. Preliminary Interface revision Notices (PIRN's) - MSFC Form 4229.
  - b. Changes to drawings and parts list shall be defined on a Notice of Revision (NOR) - DD Form 1695, as defined in MIL-STD-973, or contractor's equivalent.
  - c. Field Engineering Changes (FEC) shall be prepared and processed in accordance with the appropriate field site format and instructions. Format and processing instructions for specific sites may be obtained from MSFC CM Office Representative.

The program control number (PCN) (or its equivalent) assigned by MSFC and the proposal number assigned by the contractor shall be shown on all forms and messages.
- 15.4 **FORMAT:** The formats shall be as defined in paragraph 15.3.

**DRD Continuation Sheet**

**TITLE:** Engineering Change Proposals  
and Associated Documentation

**DRD NO.:** 916CM-005

**DATA TYPE:** 1

**PAGE:** 2/2

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**15. DATA PREPARATION INFORMATION (CONTINUED):**

**15.5 MAINTENANCE:**

- a. ECP maintenance shall be accomplished by replacement page(s) or complete revision. ECP identification shall be revised in either method.
- b. SCN's shall be maintained as complete revision and re-identification.
- c. PIRN's shall be a complete reissue.
- d. NOR's shall be a complete reissue.

**15.6 MSFC APPROVALS**

- a. Receipt of contractual approval shall constitute the sole authority for the contractor to effect a Class I engineering change.
- b. SCN's shall be approved as a part of the ECP.
- c. PIRN's shall be approved as part of the ECP.

The contractor shall prepare and submit ECP's when requested by MSFC to implement a Government-directed change.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916CM-006**
3. **DATA TYPE:** 1
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Deviation/Waiver Approval Request
7. **DESCRIPTION/USE:** Deviation: A specific written authorization granted before the fact to depart from a particular Government-controlled requirement for a limited application. Waiver: A specific written authorization accepting a departure after occurrence from a Government-controlled requirement for a limited application.
8. **OPR:** ED43                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** As required
12. **SUBMISSION FREQUENCY:** As required
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Deviation/Waiver Approval Request (DAR) requests approval to depart from a Government-controlled requirement.
- 15.2 **APPLICABLE DOCUMENTS**  
MIL-STD-973                      *Military Standard, Configuration Management*
- 15.3 **CONTENTS:** DARs shall be prepared in accordance with MIL-STD-973 (Exception: MSFC Form 847, prepared in accordance with its instructions, shall be used in lieu of the DD Form 1694). The program control number (PCN), as assigned by MSFC, and the DAR number assigned by the contractor shall be shown on all forms.
- 15.4 **FORMAT:** MSFC Form 847, "Deviation/Waiver Approval Request (DAR)" or equivalent, shall be used to document deviations/waivers.
- 15.5 **MAINTENANCE:** All requested changes to a DAR shall require submittal of a DAR revision.
- 15.6 **APPROVAL OF DEVIATIONS/WAIVERS:** Receipt of contractual approval from the procuring activity shall constitute the sole authority for the contractor to effect a DAR. This approval will be noted by disposition notation and the authorizing signature on the MSFC Form 847, or equivalent.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916CM-007**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** Configuration Accounting and Status Reports
7. **DESCRIPTION/USE:** To provide for accurate, timely, and continuing visibility of a contract configuration item.
8. **OPR:** ED43                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Three weeks prior to Preliminary Design Review (PDR)
12. **SUBMISSION FREQUENCY:** As requested
13. **REMARKS:** MIL-STD-973, *Military Standard, Configuration Management*, shall be used as a guide.
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Configuration Accounting and Status Reports describe the configuration of the hardware, software, and associated support equipment and the status of changes thereto.
- 15.2 **APPLICABLE DOCUMENTS:** None
- 15.3 **CONTENTS:** MIL-STD-973 provides guidance for the information necessary for the configuration status accounting system to be maintained by the contractor. The following reports shall be provided as specified within this DRD.
  - a. Dispositioned Change Activity Report shall list all proposed changes, deviations and waivers and shall be sorted in change proposal number sequence. The following data elements shall be provided:
    1. Change number, revision and program control number (PCN).
    2. Configuration items affected (by part number and serial number).
    3. Contract change proposal and status.
    4. Date of implementation into the affected configuration items.
  - b. Configuration Identification Report shall identify the configuration item(s) baseline and change activities. Hardware and software changes shall be listed separately. The following data elements shall be provided:
    1. Contract and contractor identification.
    2. Configuration Item identification (as applicable), configuration item number, nomenclature, part number, and specification number.
    3. Configuration change data, including:
      - (a) Change proposal identification, including type of action (e.g., ECP class, deviation or waiver).
      - (b) Change applications (e.g., hardware, software, first and total effectivities).
    4. Change disposition including the identification of contractual change authorization.

## DRD Continuation Sheet

**TITLE:** Configuration Accounting and Status Reports

**DRD NO.:** 916CM-007

**DATA TYPE:** 3

**PAGE:** 2/2

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15. **DATA PREPARATION INFORMATION (CONTINUED):**

c. Change incorporation Status Reports shall list the status of ECP incorporation into configuration items and shall be organized by configuration number. The following data elements shall be included:

1. Configuration Item identification number and serial number.
2. Change number, title, type and associated PCN.
3. Change effectivity, release data and incorporation point.
4. In-line incorporation date, scheduled and actual.
5. Modification Kit data, if applicable, that includes man-hours estimated, status, installation location, shipping date, and completion dates for installation and test, if required.

15.4 **FORMAT:** Contractor format is acceptable provided the minimum requirements of each report are addressed.

15.5 **MAINTENANCE:** None required

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916CM-008**
3. **DATA TYPE:** 2/3
4. **DATE REVISED:**
5. **PAGE:** 1/3
6. **TITLE:** Functional Configuration/Physical Configuration Audit Documentation
7. **DESCRIPTION/USE:** To support the Functional Configuration Audit (FCA) and verify the configuration item's and system's performance against its approved configuration documentation. Test data for the FCA shall be that collected from the test of the configuration of the item that is to be formally accepted. The Physical Configuration Audit (PCA) is an audit of the configuration documentation and quality control records to ensure the as-built or as-coded configuration is defined in the documentation.
8. **OPR:** ED43                      9. **DM:** SD40
10. **DISTRIBUTION:** See Attachment 2
11. **INITIAL SUBMISSION:** See Attachment 2
12. **SUBMISSION FREQUENCY:** Per configuration audit
13. **REMARKS:** The Product Baseline is normally established at the conclusion of the PCA.
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** Functional Configuration/Physical Configuration Audit Documentation contains the required documentation necessary to support the configuration audit for a configuration item (CI).
- 15.2 **APPLICABLE DOCUMENTS**  
MIL-STD-973                      *Military Standard, Configuration Management*
- 15.3 **CONTENTS:** Documentation required for the FCA and PCA shall be provided as described in MIL-STD-973 and herein: See Attachment 1.  
  
Additional documentation requirements to be provided are:
  - a. Agenda - The agenda shall specify the date, time and place for the scheduled audit, specific review items, supporting documentation, and key participants. Submit approved copies at the review. See Attachment 2.
  - b. Presentation Charts - Presentation charts shall be submitted at the start of the audit. They shall summarize the details contained in the data package and identify compliance with the contract requirements. See Attachment 2 for distribution and availability of data.
  - c. Minutes - The minutes shall contain a description of the audit with sufficient detail to enable the audit to be made a matter of record. The minutes shall include the presentation charts, a listing of RIDs, action items with actionee and suspense (closure) data, and identification of the documents which describe the approved baseline established at the conclusion of the PCA. See Attachment 2 for distribution and availability of data.
  - d. Review Item Discrepancies (RIDs) - RIDs showing action items, actionees, suspense dates and closure status shall be submitted. See Attachment 2 for distribution and availability of data.
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** As required to correct errors and to maintain RID closure status.

## ATTACHMENT 1

Page: 2/3

**Configuration Audit Required Data****Documentation required for FCA**

- Specifications.
- Drawings and parts list.
- ECPs and DARs incorporated and pending.
- Specification and drawing tree.
- Fracture control plan.
- Structural dynamics, analyses, loads, and models documentation (updated).
- Materials Usage Agreement (MUAs).
- Material Identification Usage List (MIUL).
- Certification of Qualification(s) (COQ's).
- Verification procedures and requirements.
- Complete list of successfully accomplished tests and test results.
- Complete list of successful tests if detailed test data are not recorded.
- Complete list of tests required but not performed.
- Software verification data.
- Software development documents.
- Software version description.
- Critical Design Review (CDR) RIDs and dispositions.
- Mission constraints.
- Nonconformance reports.
- Interface control drawings/documents.
- Hazard analysis/risk assessment.

**Documents required for the PCA**

- Final version of all specifications.
- Product drawings and parts list.
- Configuration accounting and status reports.
- Final version of all software documents.
- Final version of software version description document.
- Copy of all FCA findings for each CI.
- List of approved and outstanding ECPs and DARs.
- Copies of ECPs and DARs as requested at the audit.
- Acceptance test procedures and associated test results.
- Program parts selection list.
- Identification of all changes actually made during test.
- Identification of all required changes not completed.
- Identification of differences between FCA and PCA configuration and rationale showing that the changes did not degrade the selected units.
- Drawing and specification tree.
- Software verification and validation procedures and results.

**NOTE: This list may require some tailoring for a specific contract. Example would be the deletion of software requirements if no software was required per the contract.**

**ATTACHMENT 2**

Page 3/3

FCA/PCA Documentation  
Distribution and Availability of Data

Document	Data Type	FCA Copies/Availability	PCA Copies/Availability
Agenda	2	One/15 days prior to audit, Approved copies at audit	One/15 days prior to audit, Approved copies at audit
Data Package	3	One/Two weeks prior to audit	One /Two weeks prior to audit
Presentation Charts	3	One for each attendee at audit	One for each attendee at audit
Minutes	2	One at audit/ copy to each attendee within two weeks	One at audit/one to each attendee within two weeks
RIDs (generated at Review	2	Entered into MSFC RID data base during audit. Close out to be entered into the data base.	Entered into MSFC RID data base during audit. Close out to be entered into the data base.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916CM-009**
3. **DATA TYPE:** 1
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** Acceptance Data Package
7. **DESCRIPTION/USE:** To provide the documentation needed by MSFC to establish the acceptability of equipment/software for the intended use.
8. **OPR:** ED43                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Two weeks prior to each Acceptance Review (AR)
12. **SUBMISSION FREQUENCY:**
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Acceptance Data Package (ADP) contains the elements of documentation required to establish the acceptability of equipment and software.
- 15.2 **APPLICABLE DOCUMENTS:** None
- 15.3 **CONTENTS:** An ADP for hardware contract configuration items shall contain the current log book that includes:
  - a. Running/operating time and cycle for each time and cycle critical items of the Configuration Item (CI). These logs shall identify the item(s) by nomenclature, part number, and serial number and shall state the total authorized life and the life expended.
  - b. Test history log, including post manufacturing checkout and final verification tests of the CI, with the following data:
    1. Actual measurements identified to specified tests. Reference to applicable test reports are satisfactory provided that copies of the reports are provided.
    2. Brief test summary.
    3. List of unaccomplished tasks and estimated man-hours to complete.
    4. List of actual and recommended retest.
    5. Special test instructions, investigations, warnings, and problems encountered during test.
    6. Failure and corrective actions data for all failures during all testing.
  - c. Inspection records for all inspections.
  - d. Transfer records providing a history of all CI and critical component movements.
  - e. Alignment data for all CIs and critical items.
  - f. Component log books, including Government furnished items.
  - g. Weight and balance logs covering total weight and horizontal, vertical, and lateral center(s) of gravity.

## DRD Continuation Sheet

**TITLE:** Acceptance Data Package

**DRD NO.:** 916CM-009

**DATA TYPE:** 1

**PAGE:** 2/2

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15. **DATA PREPARATION INFORMATION (CONTINUED):**

h. Configuration Records:

1. Parts and drawing list identifying all parts and incorporated or pending changes to each.
2. Software configuration records defining the verified and validated software, version description documents, software certification, and the validated software program.
3. List of approved and pending deviations and waivers.
4. Complete list of hardware and software/firmware items shipped loose or separately.
5. Copy of proposed DD Form 250.

15.4 **FORMAT:** Contractor format is acceptable.

15.5 **MAINTENANCE:** The ADP shall be maintained current. Changes and/or updating shall be in accordance with the contractor's approved change control system.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916LS-001**
3. **DATA TYPE:** 2
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Government Property Management Plan
7. **DESCRIPTION/USE:** To describe the method of controlling and managing Government property.
8. **OPR:** AD41                      9. **DM:** SD40
10. **DISTRIBUTION:** Cognizant property administrator
11. **INITIAL SUBMISSION:** Preliminary three months after Authority To Proceed (ATP)
12. **SUBMISSION FREQUENCY:** Final one year after ATP, revise as required
13. **REMARKS:** This document shall be the official contract requirements document for the control and identification of all Government property.
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Government Property Management Plan defines the contractor's methods of care, accounting, and control of Government property.
- 15.2 **APPLICABLE DOCUMENTS**

FAR	<i>Federal Acquisition Regulation, Part 45</i>
NPG 5100.4B	<i>Federal Acquisition Regulation Supplement, (NASA/FAR Supplement) Part 18-45 and latest revisions thereto</i>
- 15.3 **CONTENTS:** This plan shall satisfy the requirements of the documents listed in 15.2, and the contract. This plan shall consist of those procedures which constitute the contractor's property management system and shall include the following categories:
 

a. Property management.	i. Reports.
b. Acquisition.	j. Consumption.
c. Receiving.	k. Utilization.
d. Identification.	l. Maintenance.
e. Records.	m. Subcontractor control.
f. Movement.	n. Disposition.
g. Storage.	o. Contract close-out.
h. Physical inventories.	
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

- |                        |              |                                     |
|------------------------|--------------|-------------------------------------|
| 1. <b>DPD NO.:</b> 916 | ISSUE: Draft | 2. <b>DRD NO.:</b> <b>916MA-001</b> |
| 3. <b>DATA TYPE:</b> 1 |              | 4. <b>DATE REVISED:</b>             |
|                        |              | 5. <b>PAGE:</b> 1/1                 |
6. **TITLE:** Management Plan
7. **DESCRIPTION/USE:** To provide a description of the contractor's overall management system and organization for accomplishing the requirements set forth in the contract.
8. **OPR:**                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** With proposal
12. **SUBMISSION FREQUENCY:** Update 30 days after Authority to Proceed (ATP)
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Management Plan shall describe the contractor's concept, plans, practice, and approach for accomplishing the requirements set forth in the contract, i.e., managing and controlling project tasks, experimental work, and management interfaces. The plan shall be in such detail as necessary to convey the contractor's internal procedures.
- 15.2 **APPLICABLE DOCUMENTS:** None
- 15.3 **CONTENTS:**
- a. The plan shall include a description and an outline of methods by which the contractor proposes to accomplish the following:
1. Overall organization and management approach.
2. Technical planning, including preparation of work requests and maintenance of any as-built versus as-design configurations.
3. Plan for production control, if appropriate, which includes scheduling and monitoring laboratory workloads.
- b. The plan shall also include descriptions, flow charts, schedules, and other documentation necessary to give a comprehensive plan of organization and accomplishment.
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft                      2. **DRD NO.:** **916MA-002**
3. **DATA TYPE:** 2                      4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Risk Management Plan, Analysis, and Tracking Reports
7. **DESCRIPTION/USE:** To provide the contractor and the Government a baseline document for planning, management, control, and implementation of the contractor's risk management program.
8. **OPR:** QS10                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Plan, Analysis and Tracking Report -30 days after Authority to Proceed (ATP)
12. **SUBMISSION FREQUENCY:** Update Analysis and Tracking Report as part of Preliminary Design Review (PDR), Critical Design Review (CDR) and Acceptance Review (AR) data packages. Update Plan as required.
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Risk Management Plan addresses how NASA risk management requirements are to be implemented throughout the program's life cycle. Risk Analysis identifies, evaluates, prioritizes and classifies the identified risks. The Risk Tracking Report provides risk metrics, verifies risk mitigation actions and documents risk decisions.
- 15.2 **APPLICABLE DOCUMENTS**  
NPG 7120.5                      *Program and Project Management Processes and Requirements*
- 15.3 **CONTENTS:** The Risk Management Plan shall specify how the contractor will satisfy the risk management requirements of NPG 7120.5 in a manner that is compatible with the Project Office's Risk Management Plan. The plan shall specify how the contractor will document risk management activities and how the contractor will communicate risk issues and concerns to the Government.  
  
The Risk Analysis shall contain the following data: 1) References to source data for identified risk areas such as test data, lessons learned, FMEA, hazard analysis and technical analysis; 2) Catalog of all program/project risks; 3) Risk evaluation data that identifies the impact, probability and time frame for each risk; 4) Risk classification and prioritization data.  
  
The Risk Tracking Report shall contain the following data: 1) Status of all risks and risk metrics; 2) Risk mitigation plans and verification of completed mitigation plans; 3) Risk decision summaries that will document replan of unsuccessful mitigation plans and risk acceptance/closures.
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft                      2. **DRD NO.:** **916MA-003**
3. **DATA TYPE:** 1                      4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Earned Value Management System Description (Criteria)
7. **DESCRIPTION/USE:** To provide a description of the contractor's methods, policies, and procedures utilized in meeting the requirements of NPD 9501.3.
8. **OPR:** RS40                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** After notification of selection, but prior to contract award per NFS 1852.242-74.
12. **SUBMISSION FREQUENCY:** Per the direction of the cognizant Government Contracting Officer; update as required
13. **REMARKS:** Reference is made to NPD 7120.4B, *Program/Project Management* and NPG 7120.5, *Management of Major Systems Programs and Projects*. These documents shall be used as guides in preparation of the Earned Value Management System Description. Changes to the EVMS shall be processed in accordance with NFS 1852.242-75.
14. **INTERRELATIONSHIP:** NFS 1852.242-74, "*Notice of Earned Value Management System* (March 99) and NFS 1852.242-75, *Earned Value Management System* (March 99)
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Earned Value Management System Description shall provide a description of the system and the contractor's comprehensive plan for complying with the requirements of NPD 9501.3.
- 15.2 **APPLICABLE DOCUMENTS**

NPD 9501.3	<i>Earned Value Management</i>
NFS 1852.242-74	<i>Notice of Earned Value Management System</i> (March 99)
NFS 1852.242-75	<i>Earned Value Management System</i> (March 99)
- 15.3 **CONTENTS:** The Earned Value Management System Description shall provide an understanding of each activity required to meet the requirements of NPD 9501.3. The document shall briefly, but comprehensively, present the contractor's approach and schedule of internal activities to comply with NPD 9501.3 requirements and to demonstrate this compliance to MSFC. The document shall include the contractor's plan for implementation of and activities leading up to the demonstration review with the MSFC Compliance Review Team. The contractor shall provide a monthly status of progress toward meeting this plan until the contractor's management system is accepted by the MSFC Review Team. The plan shall address the requirements of NFS 1852.242-74 and NFS 1852.242-75.
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916MA-004**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Financial Management Report (533M and 533Q)
7. **DESCRIPTION/USE:** To provide quarterly and monthly financial reports for monitoring program costs. The 533M and 533Q reports are the official cost documents used at NASA for cost type, price redetermination, and fixed price incentive contracts.
8. **OPR:** RS40                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** An initial report in the 533Q format is required within 30 working days after Authority to Proceed. Initial 533M reporting shall begin no later than 30 days after the incurrence of cost.
12. **SUBMISSION FREQUENCY:** 533Q: Quarterly; no later than the 15th day of the month preceding the quarter being reported in columns 8a, 8b, and 8c. 533M: Monthly; no later than 10 working days following the close of the contractor's accounting month.
13. **REMARKS:** The data contained in the reports must be auditable using Generally Accepted Accounting Principles.
14. **INTERRELATIONSHIP:** DRD's 916MA-CPR, *Cost Performance Report*, and 916MA-MCPR, *Modified Cost Performance Report*. NFS 1852.242-73, *NASA Contractor Financial Management Reporting*, (July 1997).
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Financial Management Report provides data on accumulated costs and funding projections for management of the contract.
- 15.2 **APPLICABLE DOCUMENTS**  
NPG 9501.2C                      *NASA Contractor Financial Management Reporting*
- 15.3 **CONTENTS:** The elements of cost for financial reporting shall be mutually agreed by the contractor and NASA project office. The Financial Management Reports (533M and 533Q) shall be prepared in accordance with the detailed instructions provided on the reverse side of the NASA Forms 533M and 533Q and the supplementary instructions set forth in NPG 9501.2C, Chapter 3.
  - a. 533Q Quarterly Report shall include actual cost and cost projections at the total contract level. The initial 533Q report shall reflect the original contract value detailed by negotiated reporting categories and serve as the original baseline plan.
  - b. 533M Monthly Report shall include actual cost and cost projections at the total contract level. A summary level page reflecting cumulative total contract cost since inception shall be included. A reconciliation between the 533M/533Q and the Cost Performance Report (CPR) or Modified Cost Performance Report (M/CPR) shall be submitted as an attachment to the 533M/533Q Report.
- 15.4 **FORMAT:** Contractor internal automated printout reports may be substituted for 533M/533Q forms (with NASA Contracting Officer's approval) provided that the contractor report contains all of the data elements required by NASA Forms 533M and 533Q. Electronic submission of contractor data is strongly encouraged (reference NPG 9501.2, paragraph 306).
- 15.5 **MAINTENANCE:** None required

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916MA-005**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** Monthly Performance Report
7. **DESCRIPTION/USE:** To provide visibility to contractor and MSFC project management of actual and potential problems and progress toward meeting the technical requirements.
8. **OPR:** BJ01                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** The first calendar month following the end of the first full month after Authority to Proceed (ATP), unless otherwise specified by the Contracting Officer
12. **SUBMISSION FREQUENCY:** Monthly, submit no later than the 14th day of the calendar month following the end of the contractor's accounting month
13. **REMARKS:** Reference is made to NPD 7120.4, *Program/Project Management* and NHB 7120.5, *Management of Major Systems Programs and Projects*. These documents shall be used as guides in preparation of the Monthly Performance Report.
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Monthly Performance Report provides data for the assessment of contract cost, schedule, logic network, and technical performance of the tasks to be performed.
- 15.2 **APPLICABLE DOCUMENTS**

NFS 1827.406-70	<i>NASA Federal Acquisition Regulation Supplement, Reports of Work</i>
NPD 9501.3	<i>Earned Value Performance Management</i>
- 15.3 **CONTENTS:** The Monthly Performance Report shall comply with NPD 9501.3 and be reported in four sections: Cost Report, Logic Network/Schedule Report, Technical Report, and Variance Report. Requirements for each report shall be applicable to both contractor and subcontractor(s). The data shall be consistent and have the same cutoff date.
  - a. Section 1: Cost Report - The Cost Report provides data for measuring the contractor's cost and schedule performance organized by summary level Work Breakdown Structure (WBS) and Organizational Breakdown Structure (OBS) elements. The following items shall be reported for both the current period and cumulative to date: Budgeted Cost of Work Scheduled, Budgeted Cost of Work Performed, Actual Cost of Work Performed, Schedule Variance, Cost Variance, Budget at Completion, and Estimate at Completion. Reporting shall be by the WBS level determined by the MSFC project office. At the summary level, the line items shall include management reserve, G&A, fees, and total.
  - b. Section 2: Logic Network/Schedule Report - The Schedule Report provides the time-phased plan for accomplishing all work under this contract. All schedules are Gantt-type schedules representing the program activities and milestones arranged hierarchically in accordance with the Contract Work Breakdown Structure (CWBS) and depicting interdependencies. The logic networks shall document the plan for completing the contract within the

## DRD Continuation Sheet

**TITLE:** Monthly Performance Report

**DRD NO.:** 916MA-005

**DATA TYPE:** 3

**PAGE:** 2/2

**15. DATA PREPARATION INFORMATION (CONTINUED):**

- negotiated time and resources and shall be maintained on automated data processing (ADP) equipment. The schedules shall contain the approved baseline schedule and depict the following information as applicable for each activity or milestone: baseline start date, baseline finish date, actual start date, actual finish date, expected start date, expected finish date, graphically show progress, description, WBS element, tier (for milestones), and OBS. Schedule trend analysis of weeks ahead/behind schedule versus calendar time should be provided. Each schedule shall also include an "AS OF" or "STATUS" date and the date of the baseline schedule. Schedules shall include the following: program schedules, logic networks, critical paths, control milestone report, data schedules, government furnished items (GFI) schedules, and miscellaneous schedules, as required by MSFC.
- c. Section 3: Technical Report - The Technical Report provides data pertaining to the establishment, progress, and accomplishment of technical performance parameters. The Technical Report shall contain a graphical depiction of status against parameters mutually agreed to by the contractor and MSFC Project Office and a narrative description of the progress toward meeting the technical requirements associated with the technical performance parameters, and a comparison of the current performance and physical characteristics with the plan to meet the contractually specified values.
  - d. Section 4: Variance Report - The Variance Report provides narrative explanation of cost, schedule, and technical variances. The report shall provide variance analysis of areas that exceed preset thresholds. The thresholds shall be mutually agreed to by the contractor and the MSFC Project Office. The variance analysis shall include the variance, the cause of the variance, impact of the variance, and the proposed plan to resolve the variance along with the expected results in terms of technical, schedule, and cost performance.
- 15.4 FORMAT:** Formats from the contractor's internal reporting system may be submitted, providing the reports contain the required data elements at the specified reporting levels in a form suitable for MSFC management use. The formats shall be proposed by the contractor and approved by MSFC. For Section 3: Technical Performance Report, the contractor shall include a completed report documentation page (Standard Form 298) as the final page of each report submitted per NFS 1827.406-70.
- Submittal of the Monthly Performance Report shall be standard hard copy and electronic media. Electronic media submittals shall be in a format compatible with MSFC project office requirements. The following ground rules shall be followed in the development, maintenance, and updating of the logic networks and schedules specified in this DRD. The ADP system employed by the contractor shall have available for each activity, milestone, and summary activity, four user defined data fields that shall be used to sort, filter, and generate specific reports as required or requested by the Government. These user defined fields shall be used to assign the following information to each activity in the schedules: WBS (approved CWBS, hardware oriented); OBS; Activity Type (activity, milestone, summary); Tier Level (identifies the tier level for milestones and activities). The contractor shall utilize the milestone/event/activity numbering scheme compatible with the Government project office program system pending definition. Contractor ADP systems utilized for schedules and cost shall be electronically linked to ensure accurate cost and schedule integration.
- 15.5 MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916MA-006**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** Technical Performance Report
7. **DESCRIPTION/USE:** To provide data for the assessment of the design, development, test, evaluation, and related integration for the system and its elements.
8. **OPR:** RS40                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** The first calendar month following the end of the first full month after Authority to Proceed (ATP), unless otherwise specified by the Contracting Officer
12. **SUBMISSION FREQUENCY:** Monthly, submit no later than the 14th day of the calendar month following the end of the contractor's accounting month
13. **REMARKS:** Reference is made to NPD 7120.4B, *Program/Project Management* and NPG 7120.5A, *Management of Major Systems Programs and Projects*. These documents shall be used as guides in preparation of the Technical Performance Report.
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Technical Performance Report presents a comparison of the expected performance and physical characteristics with the contractually specified values. It is the basis for reporting established milestones, and describes progress toward meeting the technical requirements.
- 15.2 **APPLICABLE DOCUMENTS:**

NPD 9501.3	<i>Earned Value Management</i>
NFS 1827.406-70	<i>NASA Federal Acquisition Regulation Supplement, Reports of Work</i>
- 15.3 **CONTENTS:** The Technical Performance Report shall identify specific technical parameters that are considered critical. These items shall include critical requirements such as those identified in the contract end item specification(s). The provisions for measurement and tracking each parameter may include items such as:
  - a. Specification requirements and approved changes.
  - b. Program events significant to the achievement of the end value.
  - c. Conditions of measurement.
  - d. Current measurement values.
  - e. Predicted value of end product.

Identify variances from the approved technical requirements where adjustments are not made, if such variances will cause the performance of critical items to fall below the established minimum values.

In critical areas, analyze variances exceeding the tolerances to determine causes and assess the impact of changes on measurement control parameters, interface requirements, schedule, and cost, as appropriate. In instances of subcontract impact, the subcontractor's evaluation shall be obtained.

## DRD Continuation Sheet

**TITLE:** Technical Performance Report

**DRD NO.:** 916MA-006

**DATA TYPE:** 3

**PAGE:** 2/2

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15. **DATA PREPARATION INFORMATION (CONTINUED):**

For identified performance deficiencies, procedures for developing recovery plans shall be specified that identify appropriate implications.

The contractor shall include a completed report documentation page (Standard Form 298) as the final page of each report submitted per NFS 1827.406-70.

15.4 **FORMAT:** Contractor format is acceptable. Quantitative measurements shall be utilized to determine program success.

15.5 **MAINTENANCE:** None required

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916MA-007**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/3
6. **TITLE:** Cost Performance Report
7. **DESCRIPTION/USE:** To provide information for: (1) integrating cost and schedule performance data with technical performance measures, (2) assessing the magnitude and impact of actual and potential problem areas causing significant cost and schedule variances, and (3) providing valid, timely project status information to higher management.
8. **OPR:** RS40                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** 90 days after Authority to Proceed. Format 5: Initial Cost Performance Report (CPR) shall contain rankings of cost and schedule drivers.
12. **SUBMISSION FREQUENCY:** Monthly; by the 10<sup>th</sup> working day following the close of the prior month accounting period. Format 5: Updated list of the rankings every six months, based on performance to date.
13. **REMARKS:**
14. **INTERRELATIONSHIP:** The *Financial Management Reports* (DRD 916MA-004) shall include a reconciliation between the 533M/533Q and the Cost Performance Report, which shall be submitted as an attachment to the 533M/533Q reports. The CPR reporting levels and frequency shall be in accordance with the *Contract Work Breakdown Structure* (DRD 916MA-008) and contract provisions.
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Cost Performance Report (CPR) includes data to measure cost and schedule performance.
- 15.2 **APPLICABLE DOCUMENTS**  
DI-MGMT-81466                      *Data Item Description for Cost Performance Report* (available at: [http://www.acq.osd.mil/pm/newpolicy/cpr\\_cfsr/cpr\\_finl.html](http://www.acq.osd.mil/pm/newpolicy/cpr_cfsr/cpr_finl.html))
- 15.3 **CONTENTS:** The Cost Performance Report shall include data pertaining to all authorized contract work, including both priced and unpriced effort, that has been authorized at a not-to-exceed amount in accordance with the Contracting Officer's direction. The CPR shall separate direct and indirect costs and identify elements of cost for all direct reporting elements. The CPR shall consist of:
  - a. Format 1, Work Breakdown Structure (WBS): Format 1 shall provide data to measure cost and schedule performance by summary level WBS elements, and the hardware, software, and services NASA is buying. Critical/major subcontractor summary level performance measurement data shall be included as an attachment to Format 1. Subcontractor Cost Performance Report (CPR) or Cost/Schedule Status Report (C/SSR) are acceptable.
  - b. Format 2, Organizational Categories: Format 2 provides the same data as Format 1, sorted by the contractor organization. If the contractor is organized by product, Format 2 is optional. Organizational category reporting shall be to the first level of the program's organizational structure.

## DRD Continuation Sheet

**TITLE:** Cost Performance Report

**DRD NO.:** 916MA-007

**DATA TYPE:** 3

**PAGE:** 2/3

**15. DATA PREPARATION INFORMATION (CONTINUED):**

- c. **Format 3, Baseline:** Format 3 provides the budget baseline plan against which performance is measured. It is the baseline report used to track all changes to the Performance Measurement Baseline (PMB). Format 3 shall contain baseline manpower forecasts for two 3-month periods (columns 10 and 11), two subsequent 12-month periods (columns 12 and 13), and the remainder of the contract for the last period (column 14).
- d. **Format 4, Staffing:** Format 4 shall provide manpower staffing forecasts for correlation with the budget plan and cost estimates and contain the manpower baseline which will be updated and submitted whenever the Performance Measurement Baseline changes. Organizational category reporting shall be to the first level of the program's organizational structure. Format 4 shall contain baseline and manpower forecasts for two 3-month periods (columns 10 and 11), two subsequent 12-month periods (columns 12 and 13), and the remainder of the contract for the last period (column 14).
- e. **Format 5, Explanations and Problem Analyses:** Format 5 shall be a narrative report used to explain significant cost and schedule variances and other identified contract problems. Subcontractor variance analyses (determined by the prime contractor) and a discussion of the prime contractor's analysis of the subcontractor's performance shall be provided in Format 5. In the initial submission of the CPR (Format 5), the contractor shall rank, in descending order of criticality (i.e., the most critical elements will be at the top of the list and the least critical will be at the bottom), all reporting level WBS elements anticipated (as determined by the contractor project manager) to be schedule drivers, and all WBS elements (in a similar ranking) anticipated to be the cost drivers on the project. The contractor shall submit an updated list of the rankings every six months, based on performance to date. The Government reserves the right to modify this ranking based on Government perception of criticality. If the contractor uses "critical path" scheduling techniques, identification of the critical path by WBS element will meet the schedule drivers' requirement. Ranking of the critical path cost drivers shall also be provided. These critical elements shall reconcile to the Master Schedule submitted to the Government.
- f. **Variance Analysis:** The Variance Analysis shall be a narrative report addressing the following:
  - 1. Reporting elements that equate to 50% of the list of the schedule drivers (i.e., if 20 schedule drivers are listed, the 10 most critical schedule driver variances over \$100k will be addressed). If there are 10 or less schedule driver variances, all variances over \$100k shall be addressed.
  - 2. Reporting elements that comprise the top 50% of the cost drivers (i.e., if 20 cost drivers are listed, the top 10 most critical cost driver variances over \$100k). If there are 10 or less cost driver variances, all cost variances over \$100k shall be addressed.
  - 3. Impact to the contract Estimate-at-Complete (EAC) for all cost and schedule driver variances addressed.
  - 4. Explanation for all variances at completion over \$500k.
  - 5. Corrective Action Plan, as applicable.

## DRD Continuation Sheet

**TITLE:** Cost Performance Report**DRD NO.:** 916MA-007**DATA TYPE:** 3**PAGE:** 3/3

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**15. DATA PREPARATION INFORMATION (CONTINUED):**

- 15.4 **FORMAT:** CPR formats shall be completed according to the instructions outlined in DI-MGMT-81466 and the following forms: Format 1 (DD Form 2734/1); Format 2 (DD Form 2734/2); Format 3 (DD Form 2734/3); Format 4 (DD Form 2734/4); and Format 5 (DD Form 2734/5). Images of the CPR forms are located at: [http://www.acq.osd.mil/pm/newpolicy/cpr\\_cfsr/cpr\\_gif\\_new.html](http://www.acq.osd.mil/pm/newpolicy/cpr_cfsr/cpr_gif_new.html). Contractor format shall be substituted for CPR formats whenever they contain all the required data elements at the specified reporting levels in a form suitable for NASA management use. The CPR shall be submitted electronically and followed up with a signed paper copy. The American National Standards Institute (ANSI) X12 standards (transaction sets 839 for cost and 806 for schedule), or the United National Electronic Data Interchange for Administration, Commerce and Transport (EDIFACT) equivalent, shall be used for Electronic Data Interchange. This information is located at: <http://www.unece.org/trade/untdid/>.

- 15.5 **MAINTENANCE:** None required

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916MA-008**
3. **DATA TYPE:** 2
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** Work Breakdown Structure (WBS) and WBS Dictionary
7. **DESCRIPTION/USE:** To establish a framework for reporting program cost, schedule, and technical performance. To provide a basis for uniform planning, reporting status, program visibility, and assignment of responsibilities.
8. **OPR:** RS40/VS10              9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Draft with proposal
12. **SUBMISSION FREQUENCY:** 30 days after Authority to Proceed (ATP), update as required. Revised pages shall be submitted 10 calendar days after contract WBS changes (following Government approval).
13. **REMARKS:** NPD 7120.4B, *Program/Project Management*, and NPG 7120.5A, *Program and Project Management Processes and Requirements*, and MIL-HDBK-881, *Department of Defense Handbook Work Breakdown Structure*, shall be used as guides in the preparation of the WBS and the WBS dictionary.
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
  - 15.1 **SCOPE:** The Work Breakdown Structure (WBS) establishes a product-oriented logical subdivision of hardware, software, services, facilities, etc., that make up the total project scope of work. The WBS Dictionary provides a narrative description of the tasks and effort to be performed in each WBS element.
  - 15.2 **APPLICABLE DOCUMENTS:** None
  - 15.3 **CONTENTS:**
    - a. The WBS index shall include:
      1. Line item number.
      2. WBS elements/tasks listed by title and indentured to reflect the level (e.g., level 1 is total contract; levels 2 and following are successively lower levels).
      3. Indication of phase (i.e., research, development, test and evaluation; or production; or both) with which the WBS element is associated.
      4. Contract line item associated with the WBS element.
      5. Statement of Work (SOW) paragraph numbers associated with the WBS element.
      6. Specification number of the specification that covers the WBS element (if applicable). If the specification is associated with more than one WBS element, indicate the specification paragraph numbers associated with the WBS element.
      7. Contract end item number of WBS element (if applicable).

## DRD Continuation Sheet

**TITLE:** Work Breakdown Structure (WBS) and WBS Dictionary

**DRD NO.:** 916MA-008

**DATA TYPE:** 2

**PAGE:** 2/2

15. **DATA PREPARATION INFORMATION (CONTINUED):**

b. WBS Dictionary - The WBS dictionary shall describe the technical and cost content of every WBS element and efforts associated with each element (e.g., design, development, manufacturing). For WBS elements specified elsewhere for cost reporting, the WBS dictionary definitions shall also include the exact narrative of the directly associated SOW paragraphs. The WBS dictionary shall be arranged in the same order as the contract WBS index. Following the description of the WBS element shall be a listing of lower level WBS elements. The WBS dictionary shall include the following for each WBS element:

1. WBS element title, number, and element task description.
2. Performance measurement criteria (PMC).
3. SOW paragraph number.
4. Specification (number and title) associated with the WBS element.
5. Contract line item associated with the WBS element.
6. Date, revision number, revision authorization and approved changes.
7. Contract end item/data item number and quantity.
8. Cost content and description.
9. WBS code and work order/work authorization.
10. Technical content.
11. System contractor.
12. Associate or subcontractor.
13. Applicable SOW narrative.

15.4 **FORMAT:** The WBS shall be in a chart format showing element relationships, arranged in the same order as the WBS provided in the Request for Proposal. The WBS Dictionary shall be ordered in consonance with the WBS index and shall reference each WBS element by its identifier and name.

15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916QE-001**
3. **DATA TYPE:** 1
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Quality Plan
7. **DESCRIPTION/USE:** To define the contractor's planned methods for accomplishing the applicable tasks required to satisfy the quality requirements of NPD 8730.3 and QS01-QA-007 for hardware and software respectively. The Software Quality Assurance section of the plan shall provide the contractor and the Government with a baselined document for defining, implementing, and managing quality assurance for software.
8. **OPR:** QS22                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Preliminary with proposal
12. **SUBMISSION FREQUENCY:** Baseline copy due at 30 days after Authority to Proceed (ATP), update as required
13. **REMARKS:** Software and hardware Quality Assurance Plans may be combined or separate at the discretion of the project office. Reference is made to DRD's 916RM-FMEA, *Failure Modes and Effects Analysis and Critical Items List*, and 916SA-HA, *System Safety/Hazard Analysis*.
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
  - 15.1 **SCOPE:** The Quality Plan shall identify elements of the quality assurance organization, and describe the objectives, implementing policies and procedures, and control systems utilized throughout design, development, fabrication, delivery, and usage to provide quality articles and materials. The Software Quality Assurance section will define the procedures and activities required to assure the quality of project software.
  - 15.2 **APPLICABLE DOCUMENTS**

ANSI/ASQC Q9001-1994	<i>American National Standard, Quality Systems Model for Quality Assurance in Design, Development, Production, Installation, and Servicing</i>
ANSI/ASQC Q9002-1994	<i>American National Standard, Quality Systems Model for Quality Assurance in Production, Installation, and Servicing</i>
QS01-QA-007	<i>Software Quality Assurance Plan Preparation</i>
NPD 8730.3	<i>NASA Quality Management System Policy (ISO 9000)</i>
  - 15.3 **CONTENTS:** The plan shall identify procedures and controls necessary to implement Quality requirements defined in the Statement of Work. Each appropriate quality element of ANSI/ASQC Q9001-1994 or ANSI/ASQC Q9002-1994 as applicable shall be addressed to describe the philosophy and approach for implementation. Existing policies and procedures may be utilized where cited requirements can be met. The Software Quality Assurance section shall satisfy the requirements of QS01-QA-007.
  - 15.4 **FORMAT:** Contractor format is acceptable.
  - 15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916QE-002**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** Nonconformance Record and Summary Reports
7. **DESCRIPTION/USE:** To document all nonconformances in a consistent manner and to provide summary reports of hardware and software nonconformances.
8. **OPR:** QS22                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Individual copies of nonconformance records upon request. Summary reports of all nonconformances shall be submitted via hardcopy monthly 30 days after start of manufacturing
12. **SUBMISSION FREQUENCY:** Update nonconformance records as required. Summary reports: Monthly for minor nonconformances. Major nonconformances shall be reported to the NASA quality assurance representative within 24 hours.
13. **REMARKS:** MPG 8730.3 requires that each nonconformance be documented and the procuring NASA installation be notified.
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Nonconformance Summary Reports shall provide a status summary and details for each nonconformance.
- 15.2 **APPLICABLE DOCUMENTS**

MPG 8730.3	<i>Control of Nonconforming Products</i>
SSP 41173	<i>Space Station Quality Assurance Requirements</i>
- 15.3 **CONTENTS:** The monthly summary reports shall meet the requirements of MPG 8730.3, SSP 41173 and include:
  - a. Status summary of the total quality system:
    1. Total nonconformances.
    2. Total open for corrective action.
    3. Total open for preventative action.
  - b. Details for each nonconformance:
    1. Unique and traceable number.
    2. Nomenclature and (part number, lot number, serial number, etc.) of the nonconforming article or material.
    3. Description of the required characteristic or design and a specific definition of the nonconformance.
    4. Initiator of the document.
    5. Nomenclature and part number of next assembly, if known.
    6. Date the nonconformance was documented.

## DRD Continuation Sheet

**TITLE:** Nonconformance Record Summary Reports

**DRD NO.:** 916QE-002

**DATA TYPE:** 3

**PAGE:** 2/2

**15. DATA PREPARATION INFORMATION (CONTINUED):**

7. Type of activity being conducted (e.g., fabrication, assembly, qualification test, system test, pre-delivery or pre-installation test, etc.). Reference must be made to applicable procedure numbers.
  8. Disposition (remedial action).
  9. Cause or reason for the nonconformance, including area function or activity responsible for causing the nonconformance.
  10. Recurrence control actions taken or planned.
  11. Cross-reference to the failure problem report where required.
  12. Final closure indication of nonconformance record.
  13. Manufacturer name.
- c. Trend charts showing nonconformance defect, cause, and corrective action by type.

Definition of terms are as follows:

- a. Failure - The inability of a system, subsystem component, or part to perform its required function within specified limits, under specified conditions, and for a specified duration.
- b. Nonconformance - A condition of any article or material or service in which one or more characteristics do not conform to requirements. Includes failures, discrepancies, defects, and malfunctions.
- c. Corrective action - Action needed to eliminate the causes of non-conformities.
- d. Preventative action - Action and application of controls to eliminate potential causes of non-conformities.
- e. Minor nonconformance - Any nonconformance to drawing or specification requirement that does not adversely affect safety, weight, interchangeability, service life, reliability, performance, or the basic requirements of the contract.
- f. Major nonconformance - Any nonconformance to drawing or specification requirements that adversely affects safety, weight, interchangeability, service life, reliability, performance, or the basic requirements of the contract.

**15.4 FORMAT:** Contractor format is acceptable.

**15.5 MAINTENANCE:** Updated reports required until satisfactory closeout or explanation occurs.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916RM-001**
3. **DATA TYPE:** 1
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Reliability and Maintainability Program Plan
7. **DESCRIPTION/USE:** To describe how the contractor implements and controls the hardware to satisfy reliability and maintainability requirements as defined in NASA-STD-8729.1.
8. **OPR:** QS22                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Preliminary with proposal
12. **SUBMISSION FREQUENCY:** Baseline copy due 30 days after Authority to Proceed (ATP), update as required
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Reliability and Maintainability Plan contains the information to provide the visibility of how the contractor shall ensure compliance with specified reliability and maintainability program requirements.
- 15.2 **APPLICABLE DOCUMENTS**

NASA-STD-8729.1                      *Planning, Developing and Managing an Effective Reliability and Maintainability (R&M) Program*
- 15.3 **CONTENTS:** The Reliability plan shall identify the procedures and controls necessary to implement the programmatic reliability requirements as defined in NASA-STD-8729.1 and the Statement of Work (SOW). The Maintainability plan shall identify the procedures and controls necessary to implement the programmatic maintainability requirements as defined in NASA-STD-8729.1 and the SOW.
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916 **ISSUE:** Draft 2. **DRD NO.:** **916RM-002**
3. **DATA TYPE:** FMEA - Type 2 4. **DATE REVISED:**
- CIL - Type 1 5. **PAGE:** 1/2
6. **TITLE:** Failure Modes and Effects Analysis and Critical Items List
7. **DESCRIPTION/USE:** Failure Modes and Effects Analysis (FMEA) - to determine possible modes of failures, the effects of such failures, and the criticality of such failures. Critical Items List (CIL) - to provide a list of items which are critical to aid in proportioning efforts for emphasis in design, test, and inspection. FMEAs and CILs will support risk assessment, verification of redundancy, verification of separation of redundant paths, additional design action, safety analysis, hardware/software interface analyses, test planning, mission planning, preparation of mandatory inspection points, fault detection and isolation, maintainability analyses and planning, maintenance planning and logistics planning.
8. **OPR:** QS22 9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** As part of the Preliminary Design Review (PDR) data package (hardware design 10-30% complete)
12. **SUBMISSION FREQUENCY:** FMEA - as part of the Critical Design Review (CDR) data package (hardware design 90% complete). Baseline after CDR. CIL - final due at CDR. Baseline after CDR.
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The FMEA provides for an analysis for the system to determine possible modes of failure and their effects on mission success, with the provisions for identifying each failure by its criticality category number. The CIL provides for lists of hardware identified in the FMEA categorized as being "Critical", i.e., those items whose failure could result in a loss of life or degradation of the mission. The CIL also documents (subjectively) the risk retention rationale relative to design features, testing, and inspections required which would minimize the failure occurrence probability.
- 15.2 **APPLICABLE DOCUMENTS**
- SSP 30234 *Instructions for Preparation of Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL) for the International Space Station*
- 15.3 **CONTENTS:** FMEA's shall be prepared in accordance with SSP 30234 at the lowest level required to support potential uses (see 7 above). FMEA's shall be performed to the component level and within the component to pursue all critical functions, shall identify failure modes to the piece part level when these failure modes are criticality 1 and 2, and shall include integration of all flight hardware, including Government furnished equipment (GFE).

## DRD Continuation Sheet

**TITLE:** Failure Modes and Effects Analysis and Critical Items List **DRD NO.: 916RM-002**

**DATA TYPE:** 2 – FMEA, 1 - CIL

**PAGE:** 2/2

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15. **DATA PREPARATION INFORMATION (CONTINUED):**

15.4 **FORMAT:** FMEA/CIL worksheets shall be submitted electronically in a delimited flat ASCII database file per SSP 30234.

15.5 **MAINTENANCE:** The FMEA/CIL shall be updated as appropriate when changes are made to hardware via ECP's, Waivers, or Deviations. Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916RM-003**
3. **DATA TYPE:** 3/2
4. **DATE REVISED:**
5. **PAGE:** 1/3
6. **TITLE:** Problem Reporting and Corrective Action
7. **DESCRIPTION/USE:** To provide a closed loop reporting system for NASA/MSFC notification, status, and resolution documentation of failures that impact flight hardware/software, Space Station support equipment, GSE, launch vehicle, or other payloads.
8. **OPR:** QS22                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** For reportable problems, initial report due within 48 hours of occurrence/detection. Electronic submittal shall be per SSP 30524 to the JSC PRACA database (Data Type 3)
12. **SUBMISSION FREQUENCY:** For each occurrence, initial (48-hour) notification; formal report within five working days of problem occurrence, status report within 21 days, and interim/full resolution submittals as they are developed. Status reports/updates are required as they occur until satisfactory closeout or explanation is provided. For critical hardware problems with potential life, vehicle impact, or mission impact, interim closure submittal is required prior to the mission. The interim closure submittal shall include the mission rationale and a plan of action schedule for developing full closure rationale. Closeout reports to be submitted upon completion of problem resolution activities (Data Type 2).
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
  - 15.1 **SCOPE:** The Problem Reporting and Corrective Action include the information to provide visibility and accountability of reportable problems and recurrence control. A report shall be initiated when a nonconformance fits or is suspected of fitting one of the categories defined in SSP 30223.
  - 15.2 **APPLICABLE DOCUMENTS**

NPD 8720.1	<i>NASA Reliability and Maintainability (R&amp;M) Program Policy</i>
SSP 30223	<i>Problem Reporting and Corrective Action for the Space Station Program</i>
SSP 30524	<i>Problem Reporting and Corrective Action (PRACA) Data System Requirements Document</i>
  - 15.3 **CONTENTS:** Reportable problems are:
    - a. Failures of criticality 1, 1R, 1S, 1SR, 1P, 2, 2R, 2P, 2PR, and functional criticality 3 hardware.
    - b. Unexplained hardware anomalies.
    - c. Overstress or potential overstress of hardware detected during acceptance or certification testing and subsequent operations involving flight hardware, flight support equipment, or ground equipment directly involved in mission operations.
    - d. Whenever hardware that is representative of flight hardware fails to meet its specification.

## DRD Continuation Sheet

**TITLE:** Problem Reporting and Corrective Action

**DRD NO.:** 916RM-003

**DATA TYPE:** 3/2

**PAGE:** 2/3

**15. DATA PREPARATION INFORMATION (CONTINUED):**

Problems of criticality categories 1, 1R, 1S, 1SR, 1P, 2, 2R, 2P, 2PR, and functional failures of category 3 beginning with qualification or acceptance testing shall be reported to MSFC. The problem report shall include all data required by SSP 30223 and SSP 30254, Appendix D as well as the following information:

- a. 48-hour notification:
  1. Unique identifiable report number.
  2. Date of occurrence.
  3. Nature of problem.
  4. Worst case criticality.
- b. Formal report within five working days:
  1. Unique identifiable report number (same as 48-hour report).
  2. Date of occurrence.
  3. Complete description of problem including comparison of expected events with actual events (or results).
  4. Provide failure mode criticality (update).
  5. Test operation being performed at time of occurrence (certification, acceptance, final checkout, countdown), if applicable.
  6. Nonconforming article - part name, part number, serial number, manufacturer, and lot number.
  7. Next higher assembly - part name, part number, serial number, manufacturer (as applicable).
  8. Test article - part name, part number, serial number, manufacturer.
  9. Indication of whether problem is a failure or unsatisfactory condition.
  10. Indication of whether problem is due to design deficiency or manufacturing inconsistency, if known.
  11. List test documents (if applicable).
  12. Preliminary cause of problem (if possible).
  13. Remedial action taken.
- c. Problem status report within 21 days (1 through 13 above and the following):
  1. Date of resolution.
  2. Actual cause of problem based upon failure analysis:
    - (a) If explained, refer to 15.3.e of this DRD.
    - (b) Provide work around.
  3. Corrective action implemented to prevent recurrence.
  4. Disposition of failed hardware.
  5. Identify failure mode and cause as "new" or "previously experienced." If "previously experienced" state quantity of existing occurrences on specific hardware.
  6. Identify specific Critical Items List (CIL) page applicable to criticality 1, 1R, 1S, 1SR, 1P, 2, 2R, 2P, or 2PR failure modes.
  7. Indicate time/cycle for item.
  8. Problem report numbers that relate to same problem.
- d. Problem closure to include the following:
  1. Copy of nonconformance report which initiated the problem report.
  2. Copy of test reports, studies, and presentations.
  3. Failure analysis reports.
  4. Implementation change paper.

## DRD Continuation Sheet

**TITLE:** Problem Reporting and Corrective Action

**DRD NO.:** 916RM-003

**DATA TYPE:** 3/2

**PAGE:** 3/3

**15. DATA PREPARATION INFORMATION (CONTINUED):**

- e. If no corrective action is taken or the cause of the problem cannot be determined, the problem shall have an "explained" disposition. The final report shall contain problem clarification, problem history, planned use of hardware or like units, analysis results and probable cause, last test able to detect the anomaly, methods of detecting in flight, the effect of recurrence, operational work-arounds, rationale for acceptability, and corrective action for subsequent hardware.
- f. All criticality 1 through 2PR problems shall be resolved prior to flight. If a closure or explanation cannot be provided, the problem shall be "interim closed" for resolution at a later date if:
  - 1. Problem is not applicable to hardware scheduled for that flight.
  - 2. Condition does not exist on the flight hardware.
  - 3. Condition is screened by acceptance test procedures, preflight checkout, or specialty test.
  - 4. Problem is applicable to the flight, but sufficient evidence exists that the hardware/software in question can be flown safely as an accepted risk.
  - 5. Problem is time, age, or life cycle related and the affected units will have accumulated less than 50 percent of the critical parameter(s) at the end of the scheduled in-flight use.
  - 6. Problem is an isolated occurrence experienced on less than one percent of the line replacement units, there is no indication of a generic problem, the system redundancy is not less than fail safe (1L2), and the problem is applicable to system(s) used on the flight(s); however, program management must agree that sufficient evidence exists that the hardware and/or software in question can be flown safely.
- g. In addition to the normal distribution, a copy of the reports shall be submitted to the MSFC Problem Assessment Center (PAC).
- h. Support shall be provided to the Problem Review Board (PRB) if requested by NASA.

**15.4 FORMAT:** Contractor format is acceptable.

**15.5 MAINTENANCE:** None

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916RM-004**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** MSFC ALERT System Documentation
7. **DESCRIPTION/USE:** To provide a controlled method for MSFC and contractor ALERT initiation, investigation, resolution, and response.
8. **OPR:** QS22                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** First event
12. **SUBMISSION FREQUENCY:** MSFC disseminated ALERTs - Initial response due to MSFC within 21 working days except during the launch imminent mode, when investigation and disposition of the potential problem shall be performed expeditiously to preclude constraint of flight. Contractor initiated ALERTs - Due to MSFC within ten working days of identification of reportable problem, for review and approval.
13. **REMARKS:** As-built parts lists will be provided as part of the Acceptance Data Package (ADP)
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The MSFC ALERT System Documentation provides information relative to unexpected failures or discrepant conditions of parts and materials used in equipment which may be of significant application in other equipment and to safety problems of general concern. This applies to failures or discrepant conditions encountered when such parts or materials are applied within the limits of the applicable specification.
- 15.2 **APPLICABLE DOCUMENTS**
  - SO300-BT-PRO-010                      *Government-Industry Data Exchange Program (GIDEP) Policies and Procedures Manual*
  - NPG 8735.1                              *Procedures for Exchanging Parts, Materials, and Safety Problem Data Utilizing the Government-Industry Data Exchange Program and NASA Advisories*
- 15.3 **CONTENTS:** ALERTs shall be prepared and responded to in accordance with SO300-BT-PRO-010 and NPG 8735.1 and include:
  - a. Contractor initiated ALERTs - The proposed ALERT shall include, but not be limited to:
    1. Essential details required to identify problem by types and/or manufacturer's name, special requirements and environments, the problem situation (condition) and cause, actions taken and recommendations. Such data shall be restricted to objective, factual information.
    2. Names of responsible individuals and organizations that may be contacted for further technical details.
    3. Upon MSFC approval, contractor initiated ALERTs which are of general concern shall be submitted to the Government-Industry Data Exchange Program (GIDEP) for dissemination to all participants. Proposed ALERTs which only concern NASA will be disseminated to the NASA community by the MSFC coordinator.

## DRD Continuation Sheet

**TITLE:** MSFC ALERT System Documentation

**DRD NO.:** 916RM-004

**DATA TYPE:** 3

**PAGE:** 2/2

**15. DATA PREPARATION INFORMATION (CONTINUED):**

- b. Response reports for ALERT disseminated by MSFC:
  - 1. Initial \* - As a minimum, the results of the contractor's review for applicability and impact to the hardware. (May close ALERT if information regarding usage, impact, corrective action [or rationale for "flying-as-is"] is justifiable to the project's Safety and Mission Assurance [S&MA] representative.)
  - 2. Follow-on - reports results of investigations, analyses, etc. extended beyond the 21 working days allowed for the initial report (may closeout ALERT if no corrective action required).
  - 3. Final - required to report implementation of corrective action.

Notes:

- \* This report shall include a negative response if part or material is not used.

No response required on ALERTs marked "Information Only" unless an impact is identified.

**15.4 FORMAT:**

- a. Contractor Initiated ALERT - The proposed ALERT shall be submitted to the project's S&MA representative with a copy to the MSFC ALERT coordinator. Preliminary ALERTs may be issued by letter, or a partially complete GIDEP ALERT Form (GIDEP Form 97-1), when immediate notification of the NASA community is considered urgent, and time or insufficient technical detail will not allow completion of the ALERT. Upon approval, the initiator shall follow GIDEP procedure for dissemination of the completed ALERT to all GIDEP participants.
- b. MSFC ALERT Response Report - The ALERT response shall be prepared in the contractor's format including information specified in 15.3 of this DRD.

- 15.5 MAINTENANCE:** Pertinent comments clarifying, correcting, or expanding data in a previous ALERT shall be issued as ALERT addenda on GIDEP Form 97-1 referring to the previous ALERT identification number. The letters "A," "B," "C," etc., shall be added as a suffix to the original ALERT identification number to denote successive addenda.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916RM-005**
3. **DATA TYPE:** 2
4. **DATE REVISED:**
5. **PAGE:** 1/1
6. **TITLE:** Limited Life Items List
7. **DESCRIPTION/USE:** To provide a list of items possessing limited life characteristics, and their designed or allowed usage.
8. **OPR:** QS22                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** As part of the Preliminary Design Review (PDR) data package
12. **SUBMISSION FREQUENCY:** Update as part of the Critical Design Review (CDR) data package; update as required
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** The Limited Life Items List provides for a list depicting items of hardware categorized as having "limited life", i.e., items having characteristics of quality degradation or drift with age or use.
- 15.2 **APPLICABLE DOCUMENTS:** None
- 15.3 **CONTENTS:** The Limited Life Items List shall contain the following for those items identified as time, cycle, or age sensitive:
  - a. Name of item.
  - b. Allowable time and/or cycles and age permitted.
  - c. Accumulated time and/or cycles at time of shipment.
  - d. Required time and/or cycles and age that must be remaining prior to conducting each major milestone test and launch.
- 15.4 **FORMAT:** Contractor format is acceptable.
- 15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft                      2. **DRD NO.:** **916RM-006**
3. **DATA TYPE:** 3                      4. **DATE REVISED:**
5. **PAGE:** 1/10
6. **TITLE:** Reliability and Maintainability Predictions Report
7. **DESCRIPTION/USE:** To status quantitative Reliability and Maintainability (R&M) characteristics of ISS payload functions, capabilities, and equipment.
8. **OPR:** QS22                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** As part of Preliminary Design Review (PDR) data package
12. **SUBMISSION FREQUENCY:** As part of Critical Design Review (CDR) and Functional Configuration Audit (FCA) data packages; updates as required.
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** Report shall consist of the Reliability and Maintainability predictions for flight hardware end items at the end item, on-orbit replaceable unit (ORU) and line replaceable unit (LRU) levels.
- 15.2 **APPLICABLE DOCUMENTS:**

MIL-STD-756	<i>Reliability Modeling and Prediction</i>
SSP 30234	<i>Instructions for Preparation of Failure Modes and Effects and Analysis (FMEA) and Critical Items List (CIL) for Space Station</i>
- 15.3 **CONTENTS:** The report shall consist of three volumes, as follows. Each volume may be submitted and approved independently. The volumes may be further subdivided according to subsystem architecture and/or end items, as appropriate.
 

Volume I

  - 1) General and programmatic information
  - 2) Top-level groundrules and assumptions used in performing the R&M analyses.

Volume II

  - 1) R&M source data in accordance with Table 1.
  - 2) Failure Detection Isolation and Recovery Assessment Information (see Table 2).
  - 3) Perform Preventative Maintenance Assessment per decision matrix (see Figure 1).

Volume III

FMEA/CIL summary information per SSP 30234, including summary tables (index), list of critical items, and identification of incomplete design areas.

## DRD Continuation Sheet

**TITLE:** Reliability and Maintainability Predictions Report

**DRD NO.:** 916RM-006

**DATA TYPE:** 3

**PAGE:** 2/15

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- 15.4 **FORMAT:** See R&M Source Data field definitions in Table 1. R&M Source Data shall be submitted in an electronic table (see Table 3) to be entered into the ISSP Vehicle Master Database (VMDB).
- 15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

D684-10061-01 Revision C

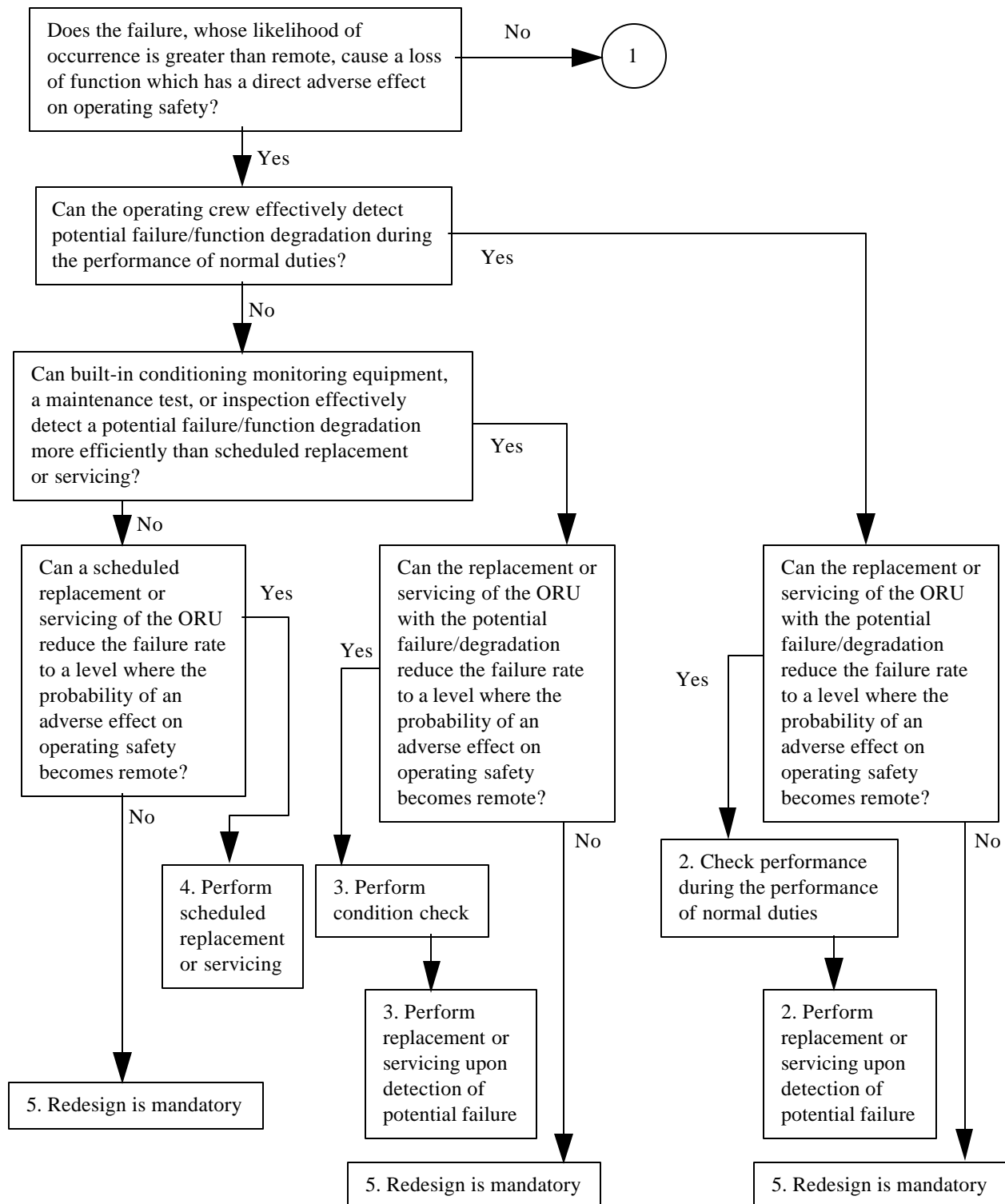


Figure 1 Preventive Maintenance Decision Matrix

D684-10061-01 Revision C

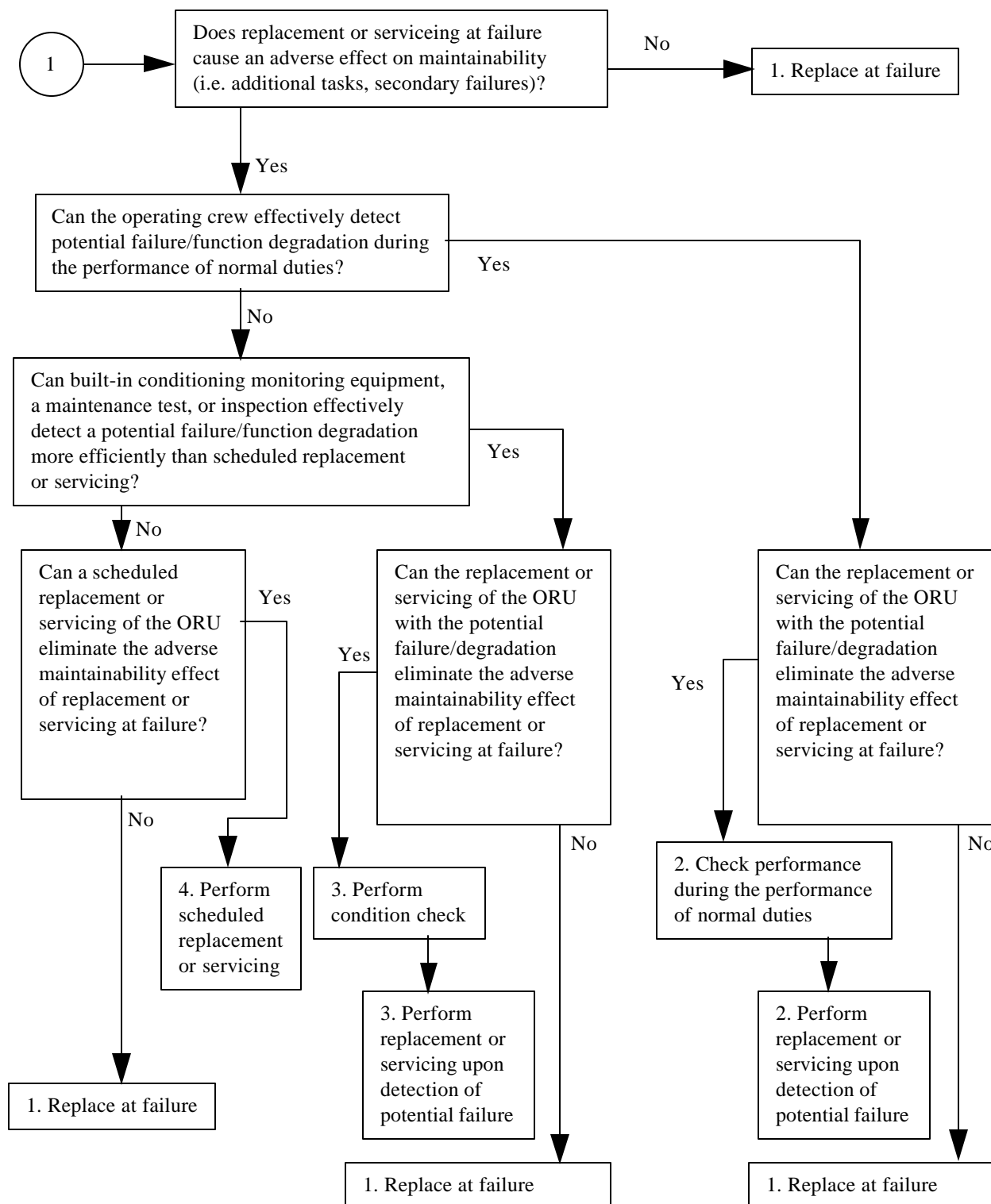


Figure 2 Preventive Maintenance Decision Matrix - Continued

**TABLE 1: R&M SOURCE DATA FIELD DEFINITION TABLE**

<b>Col</b>	<b>DESCRIPTION</b>														
<b>A.</b>	<b>Item Name</b> - R&M attributes shall be entered for each item which is to be maintained on orbit. The Vehicle Master Data Base (VMDB) nomenclature shall be used for all R&M reporting. R&M is not responsible to develop the Item Name but shall use it as a reference for reporting R&M parameters.														
<b>B.</b>	<b>Drawing/Part Number</b> - R&M attributes shall be referenced to the Drawing/Part number in the VMDB. R&M is not responsible to develop the Drawing/Part number but shall use it as a reference for reporting R&M parameters.														
<b>F.</b>	<b>Reliability Class</b> - Reliability classification. The six reliability class codes are as follows:														
	<table> <tr> <th>CODE</th><th>DESCRIPTION</th></tr> <tr> <td>1</td><td>Electronic - equipment which primarily contains digital or low power analog electronics. Moving parts are high power electrical equipment normally constitute less than 5% of the item failure rate in the classification. Electronic type will typically have a fairly high level of Built-In-Testing (BIT).</td></tr> <tr> <td>2</td><td>Electrical - equipment which performs electrical power distribution, power storage, signal distribution, and/or radio frequency radiation functions. Moving parts or low power electronics normally constitute less than 5% of the item failure rate in this classification. Electrical types will typically have a low level of BIT.</td></tr> <tr> <td>3</td><td>Electro-Mechanical - equipment which contains electrical/electronic and mechanical parts, including devices which use electrical power to produce mechanical motion, and devices which use mechanical motion to produce electrical power or signals. Electro - Mechanical items should contain more than 5% electrical/electronic and more than 5% mechanical parts by failure rate contribution in this classification.</td></tr> <tr> <td>4</td><td>Mechanical - equipment which primarily consists of moving parts, fluid handling equipment(including thermal systems), and or seals. High power electrical equipment or low power electronics normally constitute less than 5% of the failure rate in this classification.</td></tr> <tr> <td>5</td><td>Structural with Crew Contact - equipment which is primarily structural but encounters planned crew contact or provides equipment protection. This type specifically includes doors, covers, panels, hatches, micro-meteoroid/debris shields, and thermal blankets.</td></tr> <tr> <td>6</td><td>Structural with no crew Contact - equipment which is load bearing. Moving parts, electronics, and electrical equipment normally constitute less than 5% of the failure rate in this classification. Structural items should not normally encounter planned crew contact.</td></tr> </table>	CODE	DESCRIPTION	1	Electronic - equipment which primarily contains digital or low power analog electronics. Moving parts are high power electrical equipment normally constitute less than 5% of the item failure rate in the classification. Electronic type will typically have a fairly high level of Built-In-Testing (BIT).	2	Electrical - equipment which performs electrical power distribution, power storage, signal distribution, and/or radio frequency radiation functions. Moving parts or low power electronics normally constitute less than 5% of the item failure rate in this classification. Electrical types will typically have a low level of BIT.	3	Electro-Mechanical - equipment which contains electrical/electronic and mechanical parts, including devices which use electrical power to produce mechanical motion, and devices which use mechanical motion to produce electrical power or signals. Electro - Mechanical items should contain more than 5% electrical/electronic and more than 5% mechanical parts by failure rate contribution in this classification.	4	Mechanical - equipment which primarily consists of moving parts, fluid handling equipment(including thermal systems), and or seals. High power electrical equipment or low power electronics normally constitute less than 5% of the failure rate in this classification.	5	Structural with Crew Contact - equipment which is primarily structural but encounters planned crew contact or provides equipment protection. This type specifically includes doors, covers, panels, hatches, micro-meteoroid/debris shields, and thermal blankets.	6	Structural with no crew Contact - equipment which is load bearing. Moving parts, electronics, and electrical equipment normally constitute less than 5% of the failure rate in this classification. Structural items should not normally encounter planned crew contact.
CODE	DESCRIPTION														
1	Electronic - equipment which primarily contains digital or low power analog electronics. Moving parts are high power electrical equipment normally constitute less than 5% of the item failure rate in the classification. Electronic type will typically have a fairly high level of Built-In-Testing (BIT).														
2	Electrical - equipment which performs electrical power distribution, power storage, signal distribution, and/or radio frequency radiation functions. Moving parts or low power electronics normally constitute less than 5% of the item failure rate in this classification. Electrical types will typically have a low level of BIT.														
3	Electro-Mechanical - equipment which contains electrical/electronic and mechanical parts, including devices which use electrical power to produce mechanical motion, and devices which use mechanical motion to produce electrical power or signals. Electro - Mechanical items should contain more than 5% electrical/electronic and more than 5% mechanical parts by failure rate contribution in this classification.														
4	Mechanical - equipment which primarily consists of moving parts, fluid handling equipment(including thermal systems), and or seals. High power electrical equipment or low power electronics normally constitute less than 5% of the failure rate in this classification.														
5	Structural with Crew Contact - equipment which is primarily structural but encounters planned crew contact or provides equipment protection. This type specifically includes doors, covers, panels, hatches, micro-meteoroid/debris shields, and thermal blankets.														
6	Structural with no crew Contact - equipment which is load bearing. Moving parts, electronics, and electrical equipment normally constitute less than 5% of the failure rate in this classification. Structural items should not normally encounter planned crew contact.														

Col	DESCRIPTION																
<b>G.</b>	<b>IVA/EVA/Robotics Code</b> - The code which describes the level of robotic compatibility of the equipment. The codes are as follows:																
	<table> <tr> <th>CODE</th><th>DESCRIPTION</th></tr> <tr> <td><b>0</b></td><td>Equipment located in pressurized area.</td></tr> <tr> <td><b>1</b></td><td>Equipment can be maintained only by EVA crew member. No robotic support is required or intended.</td></tr> <tr> <td><b>2</b></td><td>Equipment can be maintained using SPDM without EVA. Equipment is SPDM compatible. Compatibility consists of Equipment to SPDM interface. EVA can provide maintenance support in a backup role.</td></tr> <tr> <td><b>3</b></td><td>Equipment can be maintained using SSRMS without EVA. Equipment is SSRMS compatible. Compatibility consists of Equipment to SSRMS interface. Equipment must be equipped with SSRMS grapple fixture. EVA can provide maintenance support in a backup role.</td></tr> <tr> <td><b>4</b></td><td>Equipment requires combined SPDM/EVA operations for maintenance.</td></tr> <tr> <td><b>5</b></td><td>Equipment requires EVA crew member to be positioned on SSRMS for access to the worksite. Equipment requires no robotic compatibility.</td></tr> <tr> <td><b>6</b></td><td>Equipment requires the Mobile Servicing System/SSRMS for transportation to the EVA worksite. Dimensions or mass of equipment to be replaced are not compatible with EVA/CETA translation. Equipment must be equipped with SSRMS grapple fixture.</td></tr> </table>	CODE	DESCRIPTION	<b>0</b>	Equipment located in pressurized area.	<b>1</b>	Equipment can be maintained only by EVA crew member. No robotic support is required or intended.	<b>2</b>	Equipment can be maintained using SPDM without EVA. Equipment is SPDM compatible. Compatibility consists of Equipment to SPDM interface. EVA can provide maintenance support in a backup role.	<b>3</b>	Equipment can be maintained using SSRMS without EVA. Equipment is SSRMS compatible. Compatibility consists of Equipment to SSRMS interface. Equipment must be equipped with SSRMS grapple fixture. EVA can provide maintenance support in a backup role.	<b>4</b>	Equipment requires combined SPDM/EVA operations for maintenance.	<b>5</b>	Equipment requires EVA crew member to be positioned on SSRMS for access to the worksite. Equipment requires no robotic compatibility.	<b>6</b>	Equipment requires the Mobile Servicing System/SSRMS for transportation to the EVA worksite. Dimensions or mass of equipment to be replaced are not compatible with EVA/CETA translation. Equipment must be equipped with SSRMS grapple fixture.
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<b>J</b>	<b>MTBF</b> - Mean Time Between Failures ("Hot" or "operating" MTBF). The estimated average time in hours between failures due to random effects under nominal operating conditions at the maintainable equipment level. Redundancy within the maintainable equipment item which is not necessary to meet failure tolerance requirements (e.g., component redundancy used for reducing maintenance demand) shall be modeled so as to improve the reported MTBF. Worst case estimates shall not be used. Failures of components which are used only during installation or removal (such as deployment motors and mechanisms) shall be excluded where maintenance would not be caused by the components failure. Failures of components which cause degradation of the equipment within the specified limit shall also be excluded. For complex items having components operating at different duty cycles, the operating MTBF may be adjusted to a duty cycle of 1.0. MTBF does not include failures due to Micrometeoroid/Orbital Debris (MM/OD).																
<b>K</b>	<b>Deleted</b>																
<b>L</b>	<b>Wearout Life</b> - Expected time to failure (in calendar years at the stated average duty cycles) due to wear-out, degradation, or fatigue conditions in the absence of random failures for age or cycle life limited items. Wearout life should be used as an estimate of characteristic life (L Char) in the algorithms (Table 3). Best available data and engineering judgment should be used to estimate wearout life as the time when 63 percent of a population would have failed due to wearout/aging conditions alone. Minimum design life shall not be reported as the wearout life. No life limit should be reported if the expected wearout life is 20 years or greater.																
<b>M</b>	<b>MTBPM: Removal/Replacement</b> - Mean Time Between Preventive Maintenance for Removal & Replacement - The average time in calendar hours between all preventive maintenance (PM) replacements. Care should be given when determining if preventive maintenance replacements should be performed in place of waiting until maintenance is required due to gradual performance degradation and eventual wearout (life limits).																

Col	DESCRIPTION
N	<b>MTBPM - Inspect/Service</b> - Mean Time Between Preventive Maintenance for Inspection - The average time between PM inspections and/or servicing expressed in calendar hours. A single MTBPM - Inspect/Service parameter shall be developed for any equipment items requiring multiple servicing and/or inspection actions.
Q	<b>CM IVA MTTR</b> - Mean Time to Repair - Nominal elapsed IVA crew hours at the worksite. The MTTR includes remove, replace and fault detection time. Computed for zero-g using task standards. In situations where developer does not control elemental task time enter N/A as the task time.
R	<b>Detection Percentage</b> - Percentage of ORU failure modes detected by BIT or other diagnostic techniques.

**TABLE 2: FAILURE DETECTION DATA DEFINITION TABLE****Description**

**Function** - Identify the function supported by the ORU.

**ORU** - Identify the ORU associated with the failure mode code.

**Failure Mode Code** - Reference the failure mode code for each ORU failure mode as identified in the FMEA.

**Cat/Crit Hazard < 24 Hours (Y/N)** - May a critical or catastrophic hazard occur in less than 24 hours as a result of the failure mode (Yes or No)

**Detection: A/M/N** - Specify whether **Automatic**, **Manual** or **No** detection is provided for the failure mode.

**Detection: Failure Signature Algorithms** - Describe the algorithm (including sensor/system states) used to detect the failure mode.

**Detection: SRS/LSAR Reference** - Provided a reference to the SRS that documents automatic detection, and/or the LSAR that documents manual detection procedures.

**Safe: A/M/N** - Specify whether **Automatic**, **Manual** or **No** on-orbit safing is provided for the failure mode.

**Safe: Algorithms** - Describe the algorithm (including sensor/system states) used to safe a hazard that results from the failure mode.

**Safe: SRS/LSAR Reference** - Provided a reference to the SRS that documents automatic safing, and/or the LSAR that documents manual safing procedures.

**TABLE 3: R&M Source Data Format To Be Entered Into the ISSP Vehicle Master Database (VMDB).**

<b><u>Input Col. #</u></b>	<b><u>Input Column Name</u></b>
1	Part Number
2	Mfg. Cage Code
3	Maintainability Serial Number
4	Failure Mode Code
5	Maint. Item Name
6	Maint. Distrib. System Name
7	Maint. Subsystem Name
8	Maint. ORU Function
9	Maint. ORU Des.
10	Maint. Location
11	Maint. Quantity
12	Reliability Class Code
13	Robotics Code
14	Avg. Duty Cycle Prior AC
15	Avg. Duty Cycle After AC
16	MTBF Hot
17	MTBF Cold
18	MTBCF
19	Wearout Life Amount
20	MTBPM RR
21	MTBPM IS
22	CM EVA MTTR
23	CM EVA Crew Size
24	CM IVA MTTR
25	CM IVA Crew Size
26	CM EVR MTTR
27	PM RR EVA MTTR
28	PM RR EVA Crew Size
29	PM RR IVA MTTR
30	PM RR IVA Crew Size
31	PM RR EVR MTTR
32	PM IS EVA MTTR
33	PM IS EVA Crew Size
34	PM IS IVA MTTR
35	PM IS IVA Crew Size
36	PM IS EVR MTTR
37	Manifest Flight
38	Activation Flight
39	EVA RMAT Overhead Code
40	EVR RMAT Overhead Code
41	IVA RMAT Overhead Code
42	EVA Total Maint. Crew Time
43	IVA Total Maint. Crew Time
44	EVR Total Maint. Crew Time
45	Total Maint. Actions
46	Auto 24 Des.
47	Crit. Hazard 24 Hr. Des.
48	Criticality Code
49	Detection Automation Code
50	Detection Algorithm
51	Detection SRS LSAR Ref

52	Isolation Ambiguity Level Mnt.
53	Isolation Automation Code
54	Isolation Algorithm Mnt.
55	Isolation SRS LSAR Ref Mnt.
56	Isolation Automation Code Reco
57	Isolation Algorithm Reco
58	Isolation SRS LSAR Ref Reco
59	Recovery Automation Code
60	Recovery Algorithm
61	Recovery SRS LSAR Ref
62	Safe Automation Code
63	Safe Algorithm
64	Safe SRS LSAR Ref

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916SA-001**
3. **DATA TYPE:** 1
4. **DATE REVISED:**
5. **PAGE:** 1/3
6. **TITLE:** Off-site Contractor Safety Program Plan
7. **DESCRIPTION/USE:** To provide the contractor and the Government a baseline document for planning, management, control, and implementation of the contractor's industrial safety, environmental, and flight system safety programs. It shall provide specific information on how the contractor will assure the identification, elimination and/or control of potential hazards which lead to injury, loss of personnel and/or damage or loss of flight or ground hardware throughout the complete life cycle of the program.
8. **OPR:** QS22/AD10              9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Preliminary with proposal
12. **SUBMISSION FREQUENCY:** Baseline copy due 30 days after Authority to Proceed (ATP), update as required.
13. **REMARKS:** The following are included as reference documents:
 

KHB 1860.1	<i>KSC Ionizing Radiation Protection Program</i>
KHB 1860.2	<i>KSC Non-ionizing Radiation Protection Program</i>
MPG 8715.1	<i>Marshall Safety, Health and Environmental (SHE) Program</i>
MWI 1700.1	<i>Payload Safety Readiness Review Board</i>
MWI 1700.2	<i>System Safety Program</i>
NASA-STD-6001	<i>Flammability, Odor, Offgassing, and Compatibility Requirements and Test Procedures for Materials in Environments that Support Combustion</i>
NASA-STD-8719.11	<i>Safety Standard for Fire Protection</i>
NSS 1740.12	<i>NASA Safety Standard for Explosives, Propellants, and Pyrotechnics</i>
NSS/GO 1740.9	<i>NASA Safety Standard for Lifting Devices and Equipment</i>
NSTS 07700	<i>Space Shuttle Program Definition and Requirements</i>
NSTS 08126	<i>Problem Reporting and Corrective Action (PRACA) Systems Requirements</i>
14. **INTERRELATIONSHIP:** FAR 52.223-3, *Hazardous Material Identification and Material Safety Data*; FAR 52.223-4, *Recovered Material Certification*; FAR 52.223-5, *Pollution Prevention and Right-to-Know Information*; FAR 52.223-9, *Certification and Estimate of Percentage of Recovered Material Content for EPA Designated Items*; FAR 52.223-10, *Waste Reduction Program*; FAR 52.223-11, *Ozone Depleting Substances*; FAR 52.223-12, *Refrigeration Equipment and Air Conditioners*; FAR 52.223-13, *Certification of Toxic Chemical Release Reporting*; and FAR 52.223-14, *Toxic Chemical Release Reporting*

## DRD Continuation Sheet

**TITLE:** Off-site Contractor Safety Program Plan

**DRD NO.:** 916SA-001

**DATA TYPE:** 1

**PAGE:** 2/3

**15. DATA PREPARATION INFORMATION (CONTINUED):**

15.1 **SCOPE:** The Off-site Contractor Safety Program Plan shall address how industrial and flight system safety and environmental requirements are to be implemented throughout the program's life cycle.

**15.2 APPLICABLE DOCUMENTS**

40 CFR	<i>Protection of the Environment</i>
CSTCR 127-1	<i>Consolidated Space Test Center Regulation</i>
EWRR 127-1	<i>Eastern and Western Range Regulation</i>
KHB 1700.7	<i>Space Shuttle Payload Ground Safety Handbook</i>
KHB 1710.2	<i>Kennedy Space Center Safety Practices Handbook</i>
MPG 8715.1	<i>Marshall Safety, Health and Environmental (SHE) Program</i>
NPG 8715.3	<i>NASA Safety Manual</i>
NSTS 1700.7	<i>Safety Policy and Requirements for Payloads Using the Space Transportation System</i>
NSTS 1700.7 ISS Addendum 1	<i>Safety Policy and Requirements for Payloads Using the International Space Station</i>
NSTS/ISS 13830	<i>Payload Safety Review and Data Submittal Requirements</i>
NSTS/ISS 18798	<i>Interpretations of NSTS/ISS Payload Safety Requirements</i>

15.3 **CONTENTS:** The plan shall pertain to contractor activity in the performance of the contract. The plan shall integrate and describe the relationship of all safety tasks to be implemented to meet the requirements of the documents listed in 15.2 which are applicable to each specific program/project. NPG 8715.3 provides the requirements for the Off-site Contractor Safety Program Plan. The plan shall ensure that recognized hazardous conditions that may affect contract performance or progress are identified and resolved before operations begin. The plan shall address safety tasks which are initiated during the conceptual design phase and address all aspects of the life cycle of aeronautical systems, space flight systems, flight development systems, payloads, facilities, support equipment, related safety critical hardware, and operations and support activities including construction, fabrication, manufacture, experimentation, test, packaging, transportation, storage, checkout, launch, flight, use, reentry, retrieval, disassembly, maintenance, refurbishment, and modification. The industrial safety section in the Off-site Contractor Safety Program Plan shall include:

- a. Statement of management policy, commitment, and accountability to provide for the safety and health of personnel (i.e., employees, customers, and public) and property and compliance with EPA, OSHA, and NASA requirements.
- b. Provision for top-level management monthly safety and health committee meetings.
- c. Descriptions of safety and health awareness and motivation programs, including documented safety meeting requirements, and documented safety and health awareness training for employees.
- d. Methods of hazard identification and control, e.g., hazard analysis and risk assessment.
- e. Methods to include clear statements of hazardous situations and necessary cautions in appropriate detail plans, procedures, and other working documents.
- f. Means for training each employee to recognize hazards and avoid accidents, and assuring each employee has a clear understanding of the disciplinary program.
- g. Provisions for training and certification of personnel performing potentially hazardous operations. Job categories under the contracted effort that require certification shall be identified.
- h. Descriptions of OSHA programs that require documented plans [e.g., Personnel Protective Equipment (PPE), Confined Space, and Lockout/Tagout, etc.] Note: only programs applicable to the contract need to be addressed.

## DRD Continuation Sheet

**TITLE:** Off-site Contractor Safety Program Plan

**DRD NO.:** 916SA-001

**DATA TYPE:** 1

**PAGE:** 3/3

**15. DATA PREPARATION INFORMATION (CONTINUED):**

- i. Controls of the procurement, storage, issuance, and use of hazardous substances.
- j. Method of ensuring a documented emergency management program.
- k. Method of reporting and investigating all mishaps and close calls, including an outline of reporting requirements and a description of how root cause analysis is to be accomplished.
- l. Provisions for safety, health, and environmental services such as hazardous waste disposal, emergency medical support, personnel exposure monitoring, and hazard communication.
- m. Requirements for formal safety inspections and correction of deficiencies.
- n. Requirements for documented safety visits.
- o. Means of program evaluation, identifying duties, methods and frequency for internal evaluation of the safety and health program, and identification of personnel who perform evaluations and to whom evaluations are reported and who approves corrective action.
- p. Schedules of the frequency and documentation requirements for inspections, plan and procedure reviews, and certifications.
- q. Provision for suspending work where safety or environmental conditions warrant such action.
- r. Flowdown of safety responsibilities between appropriate tiers (i.e., subcontractors).
- s. Identification of employees (by type, classification, and qualification) responsible for the implementation of the above elements.
- t. Provisions for compliance with environmental laws and regulations by: reporting hazardous and toxic substance use; implementing green procurements; reducing, reusing, and recycling of hazardous and toxic substances prior to disposal; minimizing stormwater pollution; ensuring equipment and processes permitted by applicable laws; and disposing of solid and liquid materials as permitted by applicable laws.
- u. If applicable, provision for compliance with MPG 8715.1, when work is to be performed on-site at MSFC.

**15.4 FORMAT:** Contractor format is acceptable.

**15.5 MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916SA-002**
3. **DATA TYPE:** 3
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** Mishap and Safety Statistics Reports
7. **DESCRIPTION/USE:** To provide reporting of mishaps and related information required to produce metrics for MSFC.
8. **OPR:** QS22                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:**
  - a. Type A or B mishaps: Initial notification shall be by telephone immediately. MSFC Form 4370 or by telephone (256-544-4357, select "0", and ask the technician to complete the Mishap Flash Report) shall be submitted within 4 hours of knowledge of Type A and B mishaps.  
NOTE: FOR ON-SITE CONTRACTORS, use:
  - b. Type C, Incident, and Close Call mishaps: Initial notification shall be by MSFC Form 4370 or by telephone (256-544-4357, select "0", and ask the technician to complete the Mishap Flash Report) within 4 hours of knowledge of mishaps that have the potential for lost-time; damage exceeding \$25,000; impacting critical project/program schedule; or gaining public attention in accordance with MWI 8621.1.  
NOTE: FOR OFF-SITE CONTRACTORS, use:
  - b. Type C, Incident, and Close Call mishaps: Initial notification shall be by the next MSFC Form 4371 following any mishaps that have the potential for lost-time; damage exceeding \$25,000; impacting critical project/program schedule; or gaining public attention in accordance with MWI 8621.1.
  - c. A follow-up mishap report shall be submitted using NASA Form 1627 within 10 days of mishap in accordance with MWI 8621.1.
  - d. MSFC Form 4371 listing the baseline information (e.g., contract number, subcontractors, SIC codes, number of employees, number of supervisors, etc.) shall be submitted by the 10<sup>th</sup> of each month following contract award.
  - e. Mishap Board Report: After completion of Type A or B mishap investigation.
12. **SUBMISSION FREQUENCY:**
  - a. MSFC Form 4370 - Each occurrence of a mishap.
  - b. NASA Form 1627 - Each occurrence of a mishap. Corrective action status reports are due every 30 days until the final report is submitted.
  - c. MSFC Form 4371 - By the 10<sup>th</sup> of each month.
  - d. Mishap Board Report – Each occurrence of a Type A or B mishap.
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
  - 15.1 **SCOPE:** The Mishap and Safety Statistics Reports document all mishaps and close calls as required in NPG 8621.1.
  - 15.2 **APPLICABLE DOCUMENTS**

NPG 8621.1 *NASA Procedures and Guidelines for Mishap Reporting, Investigating, and Recordkeeping*  
MWI 8621.1 *Close Call and Mishap Reporting and Investigation Program*

## DRD Continuation Sheet

**TITLE:** Mishap and Safety Statistics Reports

**DRD NO.:** 916SA-002

**DATA TYPE:** 3

**PAGE:** 2/2

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15. **DATA PREPARATION INFORMATION (CONTINUED):**

15.3 **CONTENTS:** The reports shall contain the information required by NPG 8621.1. The contractor shall use the forms listed in 15.4 to report mishaps and related information required to produce the safety metrics.

15.4 **FORMAT:** The following formats shall be submitted:

- a. MSFC Form 4370, "MSFC Flash Mishap Report."
- b. NASA Form 1627, "NASA Mishap Report."
- c. MSFC Form 4371, "MSFC Contractor Safety Statistics."
- d. Mishap Board Report using the format provided in NPG 8621.1.

15.5 **MAINTENANCE:** Changes shall be incorporated by change page or complete reissue.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916SA-003**
3. **DATA TYPE:** 1
4. **DATE REVISED:**
5. **PAGE:** 1/2
6. **TITLE:** System Safety/Hazard Analysis
7. **DESCRIPTION/USE:** The intent of the hazard analysis is to reduce safety risk and to establish the acceptable risk of the program through the iteration process. It shall facilitate and support a hazard control and mission risk management program for the International Space Station (ISS) and Space Shuttle payloads and provide information to the Government regarding hazards identified through analysis techniques and the status of their resolution and level of control.
8. **OPR:** QS22                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** As part of the Preliminary Design Review (PDR) data package.
12. **SUBMISSION FREQUENCY:**
  - a. Hazard analyses shall be developed in parallel and in support of design, development, and operational phases of the program. The hazard analyses shall mature as the payload hardware design matures and shall be submitted for review/approval in concert with appropriate program milestones.
  - b. The submission frequency for the phased safety reviews can be found in NSTS/ISS 13830.
13. **REMARKS:**
14. **INTERRELATIONSHIP:**
15. **DATA PREPARATION INFORMATION:**
- 15.1 **SCOPE:** System Safety Hazard Analyses identify hazards, evaluate risk, and establish verification methods for the ISS and Space Shuttle Payload programs.
- 15.2 **APPLICABLE DOCUMENTS**
  - a. ISS Payload:

JSC 26943	<i>Guidelines for the Preparation of Payload Flight Safety Data Packages and Hazard Reports for Payloads using the Space Shuttle</i>
KHB 1700.7	<i>Space Shuttle Payload Ground Safety Handbook</i>
NSTS/ISS 13830	<i>Implementation Procedure for NSTS Payloads System Safety Requirements for Payloads Using the Space Transportation System and the International Space Station</i>
NSTS 1700.7 Addendum	<i>Safety Policy Requirements for Payloads Using the International Space Station</i>
NSTS 18798	<i>Interpretations of NSTS and ISS Payload Safety Requirements</i>

## DRD Continuation Sheet

**TITLE:** System Safety/Hazard Analysis

**DRD NO.:** 916SA-003

**DATA TYPE:** 1

**PAGE:** 2/2

**15. DATA PREPARATION INFORMATION (CONTINUED):**

**b. Shuttle Payload:**

JSC 26943	<i>Guidelines for the Preparation of Payload Flight Safety Data Packages and Hazard Reports for Payloads using the Space Shuttle</i>
KHB 1700.7	<i>Space Shuttle Payload Ground Safety Handbook</i>
NSTS/ISS 13830	<i>Implementation Procedure for NSTS Payloads System Safety Requirements for Payloads Using the Space Transportation System and the International Space Station</i>
NSTS 1700.7	<i>Safety Policy and Requirements for Payloads Using the Space Transportation System</i>
NSTS 18798	<i>Interpretations of NSTS and ISS Payload Safety Requirements</i>

- 15.3 CONTENTS:** The analyses shall identify hazards, evaluate risk, and establish verification methods applicable to design, development, manufacturing and assembly, testing, inspection, integration, and flight including its ground support equipment (GSE), facilities, and ground operations.

The ISS/Shuttle Payload Safety Compliance Data Packages shall contain, as a minimum, the data required by NSTS 13830 for the appropriate phase review and type (flight or ground).

- 15.4 FORMAT:** Contractor format is acceptable unless explicitly specified by the documentation referenced in 15.2.

- 15.5 MAINTENANCE:** The hazard analyses shall be updated as the program progresses, providing continuity and covering the interrelated areas of design, operations, and vehicle subsystem integration.

## DATA REQUIREMENTS DESCRIPTION (DRD)

1. **DPD NO.:** 916                      **ISSUE:** Draft
2. **DRD NO.:** **916SE-001**
3. **DATA TYPE:** 1
4. **DATE REVISED:**
5. **PAGE:** 1/4
6. **TITLE:** Interface Control Documents
7. **DESCRIPTION/USE:** To provide documentation in the form of drawings and/or written records to identify for each side of an interface those necessary design definitions between contractors and/or Government agencies to provide control of and assure an agreeable and compatible interface. The Interface Control Document (ICD) provides the design solutions to the requirements found in the system specifications and/or the Interface Requirements Document (IRD).
8. **OPR:** VS10                      9. **DM:** SD40
10. **DISTRIBUTION:** Per Contracting Officer's letter
11. **INITIAL SUBMISSION:** Three weeks prior to Systems Requirement Review (SRR)
12. **SUBMISSION FREQUENCY:** Three weeks prior to Preliminary Design Review (PDR) and Critical Design Review (CDR), baseline after CDR, update as required
13. **REMARKS:** Attachment A to this DRD contains a sample Interface Control Document outline.
14. **INTERRELATIONSHIP:** ICD content is traceable to the requirements found in the system specifications (DRD STD/CM-SPEC) and/or the Interface Requirements Document (STD/SE-IRD).  
(WEE NEED TO ADDRESS IF WE LEAVE THIS IN???????????)
15. **DATA PREPARATION INFORMATION:**
  - 15.1 **SCOPE:** The Interface Control Documents (ICD's) identify design definitions for each side of an interface that shall assure design control and compatibility.
  - 15.2 **APPLICABLE DOCUMENTS:** None
  - 15.3 **CONTENTS:** ICD's shall address all physical, functional, and procedural requirements (found in the System Specification and/or Interface Requirements Document) necessary to describe the interfaces that must be met to ensure project, hardware, and software compatibility. These requirements shall include the following:
    - a. Physical - Interfaces involving physical mating and spatial relationships between interconnecting parts of interfacing end items, including clearance envelopes established to avoid interferences and to permit access.
    - b. Functional - Interfaces involving the interaction or influence of conditions imposed by one subsystem or component upon another or by external sources such as fluids, thermal, electrical, environmental, data, and loads.
    - c. Procedural - Interfaces involving critical sequence of events occurring in assembly, disassembly, alignment, service operations, and computer programs.
  - 15.4 **FORMAT:** Contractor format is acceptable.
  - 15.5 **MAINTENANCE:** Changes shall be incorporated as approved by Engineering Change Proposal (ECP).

**Attachment A**  
**Sample Outline for Interface Control Document**

- 1.0 SCOPE
  - 1.1 Introduction - *This section identifies the extent and the systems/subsystems to which the ICD is applicable.*
  - 1.2 Program Description - *This section presents a brief description of the overall program and identifies each applicable interface. It will provide a general description of each interface and any other related systems.*
  - 1.3 Roles and Responsibilities - *This section will define the technical responsibilities for each organization involved in controlling the interface. It will specify who has prime and who has support responsibilities and will appropriately present a programmatic schedule. The members and responsibilities of the Interface Control Working Group (ICWG) will also be identified.*
  - 1.4 Interface Configuration Management - *This section will specify how configuration control of the interface will be managed.*
  - 1.5 Contractor and Government/Customer Deliverables - *This section will summarize any agreements that involve the interchange or delivery of hardware, software, or data between or among organizations. A clearly defined schedule will be provided and agreed to by all affected organizations.*
- 2.0 APPLICABLE DOCUMENTS - *This section must contain a list of every document referenced in the text. Every document listed here must be referenced in the ICD text. A standard paragraph is usually included as follows: "The following documents, latest revision unless otherwise specified, form a part of this specification to the extent specified herein. In the event of conflict between documents referenced herein and the contents of this specification, this specification shall apply, except for safety-related items and issues."*
  - 2.1 Government Documents - *Government documents shall be listed by the document number and title in the following order:*
    - 1. Specifications: federal, military, and other government agency.
    - 2. Standards: federal, military, and other government agency.
    - 3. Drawings: where detailed drawings referenced in a specification are listed on an assembly drawing, it is only necessary to list the assembly drawing.
    - 4. Other publications: manuals, regulations, handbooks, bulletins, etc.
  - 2.2 Contractor Documents - *Non-government documents shall be listed by the document number and title in the same order (i.e., specifications, standards, drawings, other).*
- 3.0 INTERFACE DEFINITION AND DESCRIPTION
  - 3.1 A-to-B Interface Characteristics and Functions - *More detailed information on interface functional descriptions and unique interface properties will be provided here. The remaining paragraphs in this document will contain the interface design details. The sections specified in 3.2 through 3.10 below are provided as a checklist. Each of these topics listed, when applicable, will be accompanied by detailed interface drawings, schematics, wiring data, quantitative tables listing specific requirements (i.e. loads, environments), interface characteristics, etc., in order to specify exact parameters of the interface. The document will only contain those sections applicable to the interface.*

DPD: 916

Issue: Draft

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**Attachment A**  
**Sample Outline for Interface Control Document**

- 3.2 Mechanical Interfaces
  - 3.2.1 Envelopes
  - 3.2.2 Coordinate Systems
  - 3.2.3 Mounting/Installation
  - 3.2.4 Stowage Provisions
  - 3.2.5 Handling
  - 3.2.6 Purge, Vent, Drain
  - 3.2.7 Umbilicals and Appendages
  - 3.2.8 Flight Crew
  - 3.2.9 Personnel
- 3.3 Structural Interfaces
  - 3.3.1 Loads
    - 3.3.1.1 Acoustic
    - 3.3.1.2 Transportation
    - 3.3.1.3 Flight
    - 3.3.1.4 Vibration
    - 3.3.1.5 Ground Handling
    - 3.3.1.6 Flight Crew
    - 3.3.1.7 Personnel
  - 3.3.2 Structural Characteristics
    - 3.3.2.1 Flexibility
  - 3.3.3 Mass Properties
    - 3.3.3.1 Weight/Mass
    - 3.3.3.2 Center of Gravity
    - 3.3.3.3 Moments of Inertia
- 3.4 Environmental Issues
- 3.5 Electrical Interfaces
  - 3.5.1 Power
  - 3.5.2 Switching
  - 3.5.3 Fusing
  - 3.5.4 Grounding
  - 3.5.5 Electro-Explosive Devices
  - 3.5.6 EMI/EMC
- 3.6 Communications and Data Handling Interfaces
  - 3.6.1 Communications
  - 3.6.2 Telemetry
  - 3.6.3 Tracking
  - 3.6.4 Command
- 3.7 Performance Interfaces
  - 3.7.1 Orbits
  - 3.7.2 Delta V

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**Attachment A**  
**Sample Outline for Interface Control Document**

- 3.8 Operations Interfaces
  - 3.8.1 Flight Operations
    - 3.8.1.1 Docking/Alignment
    - 3.8.1.2 Rendezvous
    - 3.8.1.3 Deployment/Retrieval
    - 3.8.1.4 Flight Crew
  - 3.8.2 Ground Operations
    - 3.8.2.1 Checkout
    - 3.8.2.2 Prelaunch
    - 3.8.2.3 Post Landing
    - 3.8.2.4 Personnel
  - 3.8.3 Command/Control Center
    - 3.8.3.1 Man-Machine Operations
    - 3.8.3.2 Personnel
- 3.9 Safety
  - 3.9.1 Design Safety
  - 3.9.2 Flight Operations
  - 3.9.3 Ground Operations
  - 3.9.4 Range Safety
- 3.10 Reliability
  - 3.10.1 Reliability Design
- 3.11 Maintainability
- 4.0 APPENDICES
  - 4.1 Interface Control Drawings
  - 4.2 Supporting Data